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Refuse derived fuel (RDF) is the major product (80.6% by weight) of the refuse processing plant, the other being ferrous metal scrap, a marketable by-product. Average operating costs for the entire evaluation period were $8.26/Mg ($7.49/ton). The average overall processing rate for the period was 168 Mg/8-hr day (185.5 tons/8-hr day) at 31.0 Mg/hr (34.2 tons/hr).

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ST. LOUIS DEMONSTRATION FINAL REPORT: REFUSE PROCESSING PLANT EQUIPMENT, FACILITIES, AND ENVIRONMENTAL EVALUATIONS

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FOREWORD

The Environmental Protection Agency was created because of increasing public and government concern about the dangers of pollution to the health and welfare of the American people. Noxious air, foul water, and spoiled land are tragic testimony to the deterioration of our natural environment. The complexity of that environment and the interplay between its components require a concentrated and integrated attack on the problem.

Research and development is that necessary first step in problem solution and it involves defining the problem, measuring its impact, and searching for solutions. The Municipal Environmental Research Laboratory develops new and improved technology and systems for the preservation and treatment of public drinking water supplies, and to minimize the adverse economic, social, health, and aesthetic effects of pollution. This publication is one of the products of that research; a most vital communications link between the researcher and the user community.

The St. Louis-Union Electric-EPA refuse fuel project was the first demonstration of the use of solid waste as a supplementary fuel in power plant boilers for generating electricity. In addition to the demonstrations, research tasks were conducted to evaluate the processing plant and the power plant operations. This report presents the results of the processing plant evaluations. It provides data on plant material flows and operating parameters, plant operating costs, characteristics of plant material flows, and emissions from various processing operations. A separate report will provide similar information on the evaluations conducted at the power plant which burned the refuse derived fuel.

Francis T. Mayo, Director
Municipal Environmental Research
Laboratory

ABSTRACT

This report presents the results of processing plant evaluations of the St. Louis-Union Electric Refuse Fuel Project, including equipment and facilities as well as assessment of environmental emissions at both the processing and the power plants. Data on plant material flows and operating parameters, plant operating costs, characteristics of plant material flows, and emissions from various processing operations were obtained during a testing program encompassing 53 calendar weeks.

Refuse derived fuel (RDF) is the major product (80.6% by weight) of the refuse processing plant, the other being ferrous metal scrap, a marketable by-product. Average operating costs for the entire evaluation period were $8.26/Mg ($7.49/ton). The average overall processing rate for the period was 168 Mg/8-hr day (185.5 tons/8-hr day) at 31.0 Mg/hr (34.2 tons/hr).

Future plants using an air classification system of the type used at the St. Louis demonstration plant will need an emissions control device for particulates from the large de-entrainment cyclone. Also in the air exhaust from the cyclone were total counts of bacteria and viruses several times higher than those of suburban ambient air. No water effluent or noise exposure problems were encountered, although landfill leachate mixed with ground water could result in contamination, given low dilution rates.

This report was submitted in fulfillment of Contract No. 68-02-1324 and Contract No. 68-02-1871 by Midwest Research Institute under the sponsorship of the U.S. Environmental Protection Agency. This report covers the period September 23, 1974, to September 30, 1975.

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This report was prepared for the Environmental Protection Agency under Contracts Nos. 68-02-1324 and 68-02-1871. It describes the work carried out by Midwest Research Institute (MRI) at the St. Louis Refuse Processing Plant for the period of September 23, 1974, through September 30, 1975.

Mr. Doug Fiscus, Mr. Paul Gorman, Mr. M. P. Schrag, and Dr. L. J. Shannon were the principal authors of this report. Many other MRI personnel assisted in compilation and analysis of the data. Actual equipment tests and refuse sampling were carried out at the processing plant by Mr. Steve Howard, Mr. Lynn Cook, and Mr. Edward Gonzales, under the direction of Mr. Doug Fiscus (MRI Field Manager). Most of the laboratory analyses of the refuse samples were done by the Research 900 Laboratories of the Ralston Purina Company in St. Louis, Missouri. The conduct of this test and evaluation program at the processing plant would not have been possible without the excellent cooperation and assistance provided by Mr. Wayne Butterfield (formerly Refuse Commissioner, now Traffic and Transportation Administrator, City of St. Louis), Mr. Jim Shea (Refuse Commissioner, City of St. Louis), and the Refuse Processing Plant staff, especially Mr. John Molitor, Mr. Dick Yung, and Mr. Roger Chadwick.

Approved for:

MIDWEST RESEARCH INSTITUTE

L J Shannon

L. J. Shannon, Director
Environmental and Materials
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April 15, 1977

INTRODUCTION

The St. Louis Union Electric System is the first demonstration plant in the U.S. to process raw municipal waste for use as a supplementary fuel in power plant boilers. In addition to producing a fuel, ferrous metals are recovered from the waste for use as a scrap charge in steel production. Two separate facilities comprise the system--a processing plant operated by the City of St. Louis and two identical boilers (Combustion Engineering, 125 Mw, tangentially fired), which were modified to fire shredded, air classified refuse along with pulverized coal at the Union Electric Company's Meramec Plant near St. Louis.

This demonstration facility had been in operation for over 2 years and had shown that such a system is a workable method for utilizing processed municipal refuse as a supplementary fuel, and that a saleable by-product (ferrous metal scrap) can also be recovered. Since the St. Louis facility has been in operation, several similar facilities have been placed under construction, or are being planned in other cities. Because of that and the growing interest in this resource recovery method, EPA expanded their demonstration program at St. Louis to permit a more detailed study of the performance and characteristics of the operation including environmental aspects.

EPA contracted with MRI to conduct a test and evaluation program at the St. Louis demonstration facility. This program included equipment and facilities evaluations and environmental assessments at both the refuse processing plant operated by the City of St. Louis and the refuse firing facility operated by Union Electric Company's Meramec Plant.

This report presents the results of test and evaluation activity at the processing plant during the 1-year (53-week) period of September 23, 1974, through September 30, 1975. In order, the report presents (a) approach, (b) evaluation of facilities, (c) plant material flow and characterization, and (d) environmental evaluation.

CONCLUSIONS AND RECOMMENDATIONS

RDF has approximately 62% the heating value and 2.7 times the ash content of Illinois Orient 6 coal. However, the refuse fuel has only approximately 12% the sulfur content and 35% the nitrogen content of the coal. The ferrous metal recovered by the processing plant is a marketable by-product that was utilized as part of the scrap charge at a nearby steel mill. On the average by weight, RDF represents 80.6% and recovered ferrous metal 4.5% of the processed raw refuse. The plant reject material which was landfilled had very low energy content. There is little value in trying to recycle the rejects to recover energy.

As would be expected, operating costs per megagram (Mg) of RDF produced increase rapidly when the plant is operated below its design capacity. Total monthly operating costs for the refuse processing plant plus the receiving facility ranged from $4.45 to $57.99/Mg ($4.04 to $52.6/ton) represented that month when the plant was operated near design capacity and no unscheduled shutdowns occurred. Average total operating costs for the entire 1-year evaluation period were $8.26/Mg ($7.49/ton).

ASSESSMENT OF ENVIRONMENTAL PROBLEMS

Future plants using an air classification system of the type used at the St. Louis demonstration plant will need an air emission control device to control particulate emissions from the large de-entrainment cyclone. Particulate concentration in the air exhaust to atomosphere from this cyclone averaged 0.57 g/Nm^3 (0.25 grains/ft^3). Also total counts of bacteria and viruses at levels several times higher than that found in suburban ambient air were found in this air exhaust.

The quantity of water effluent from washdown of the plant is small, and no water pollution problem exists.

A sound survey of the plant revealed several locations above 90 dBA, the maximum allowable level for continuous 8-hr exposure. However, no worker is present at these locations for 8 hr or more. Therefore, no worker noise exposure problems presently exist.

An analysis of laboratory-produced leachate from the processing plant products that might be landfilled (RDF and magentic belt rejects) was performed . The results of this analysis indicated that if leachate from a landfill were to be mixed with groundwater, contamination could result if the dilution rate of leachate to groundwater were not high enough.

PROCESSING PLANT OPERATIONS

The overall processing rate average for the entire test period was 168 Mg/8-hr day (185.5 tons/8-hr day) at 31.0 Mg/hr (34.2 tons/hr).

In the first 2 weeks of the test period, the plant was operated at maximum capacity of 272 Mg/8-hr day (300 tons/8-hr day), demonstrating that the plant was capable of sustaining this rate at least over a 2-week period. The maximum processing rate achieved for a 1-day average was 45.8 Mg/hr (50 tons/hr).

Two major equipment breakdowns occurred at the processing plant, breakage of a drag chain conveyor to the air classifier, and failure of the hammermill electrical system. Several plant shutdowns occurred due to equipment maintenance outages at the Union Electric power plant, and once for repair of an electrical substation serving the refuse processing plant. As is the case with any facility having mechanical equipment, planned shutdowns also occurred to perform normal maintenance.

The plant material balance by weight showed that plant output averaged 7.6% less than the plant input. Scale error and moisture and particulate loss from the air classifier and dust collection system were identified to account for 1.6% loss, leaving a 6% unaccounted error. It is theorized that moisture loss from the hammermill is the major cause of this material loss.

APPROACH

The test and evaluation program conducted by MRI at the processing plant included three primary areas of investigation:

1. Equipment and facilities evaluation;

2. Characterization of plant flow streams; and

3. Environmental evaluations.

The specific items included in the program are detailed in Table 1 and served as the basis for development of the test schedules and procedures. The program consisted of sampling and analysis and equipment and facilities evaluation for the 53-week test period according to the test program shown below.

Production week No.[a]	Specified daily raw refuse processed, Mg (tons)	Refuse sampling schedule
1,2	272 (300)	Daily (8 streams sampled)
3-5	136+ (150+)	Daily (4 input/output streams sampled)
6	Nonspecified	None - environmental testing at U.E.
7	Nonspecified	None - prepare for environmental testing at processing plant
8	As required for normal Mg/hr rate	Daily - environmental tests at processing plant (5 input/output streams sampled)
9-11, 13-23	Nonspecified	Weekly composite for 5 input/output streams
24-26	Nonspecified	Daily (5 input/output streams sampled)
27	Nonspecified	Daily (Fine Grind Emission Tests)
28-32	Nonspecified	Daily (5 input/output streams sampled)
36	As required for normal Mg/hr rate	Daily (hazardous emission testing)
37-38, 40-45	Nonspecified	Daily (5 input/output streams sampled)

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[a] Number of weeks less than 53 because of 8 weeks with no production.

Table 1. PROCESSING PLANT--SPECIFIC EQUIPMENT, FACILITIES, AND ENVIRONMENTAL EVALUATIONS

1. Material balance to determine amount (by weight) of material entering plant versus amounts of refuse fuel and by-products produced.

2. Determine heating value of material entering plant versus heating value of refuse fuel produced (i.e., determine how much of potential heating value may be lost in by-product streams).

3. Characterization of various material flows as to:

   Moisture content
   Ash content
   Bulk density
   Size analysis
   Heating value
   Composition (percent-paper, plastic, wood, glass, magnetic metal, other metals, other organics, miscellaneous)
   Chemical analyses (Fe, Al, Cu, Pb, Ni, Zn)

4. Characterization of equipment as to:

   Amperage (nameplate and actual)
   RPM
   Air flow (blowers)
   Belt width and speed (conveyors)
   Grate size (hammermill)
   Downtime and maintenance requirements or modifications
   Physical size of equipment, etc.

5. Use the above information to evaluate the system and its components. This evaluation will identify operability as well as capability in terms of:

   Shredding size
   Separation efficiency (energy recovery)
   Ferrous metal recovery efficiency
   Operating hours and downtime
   Plant operating costs
   Electric power required per ton of refuse processed
   Total costs per ton of refuse processed

6. Quantify and characterize air, liquid and solid waste effluents from the processing plant to include:

   Air emissions from ADS cyclone
   Air emissions from HM cyclone
   Effluent from area washdown activities
   Reject material hauled to landfill

Even though refuse samples were not taken during weeks 6, 7, 12, 13, 14, 15, and 19, plant material flows, man-hours, and costs were recorded.

Recording of plant downtime, maintenance requirements, operating costs, etc., was performed and compiled on a monthly basis for the full year.

A flow diagram of the refuse processing plant and the material sampling locations are shown in Figure 1. Figure 2 shows the RDF-receiving facility located 31 km (19 miles) away at the power plant. No samples were taken at the receiving facility, because only RDF was handled at this facility and RDF had been previously sampled at the processing plant. However, its equipment description was recorded, and the cost of its operation is included in the cost analysis of the refuse plant.

The material sampling and analyses performed during the test period are shown in Tables 2 through 4. Samples of the material flow streams were taken using a 9.5-liter (10-qt) container. This container was manually passed through the material flow streams in free fall as they were being discharged from a conveyor belt. By sampling the material in free fall, a representative sample was obtained. Either two or four daily samples were taken to form a daily or weekly composite sample as shown in Tables 2 through 4. The daily samples were equally spaced throughout the day. For example, if the plant operated 4 hr, and the sampling program specified four samples per day, then a sample was taken once per hour.

The daily samples were stored in a 75-liter (20-gal.) sealed container. Samples for analysis were prepared by first manually well mixing the composite samples using a small spade, and then extracting two portions. A 9-liter (0.3-ft^3) portion was sent to a laboratory for determination of all items except bulk density and hand pick composition. A 20-liter (0.7-ft^3) portion was used for bulk density. The material was poured into a 17.56-liter (0.62-ft^3) round container in a careful manner so as to avoid packing, and then struck off to insure a level fill. The net weight of this container was determined and the bulk density calculated. A small portion of this material was then utilized for the hand picked composition.

Composition analysis was performed using only a hand-held magnet to extract ferrous metal, several tongs, and a 6-mm (0.25-in.) square mesh screen to aid in separation of the sample into its various components.

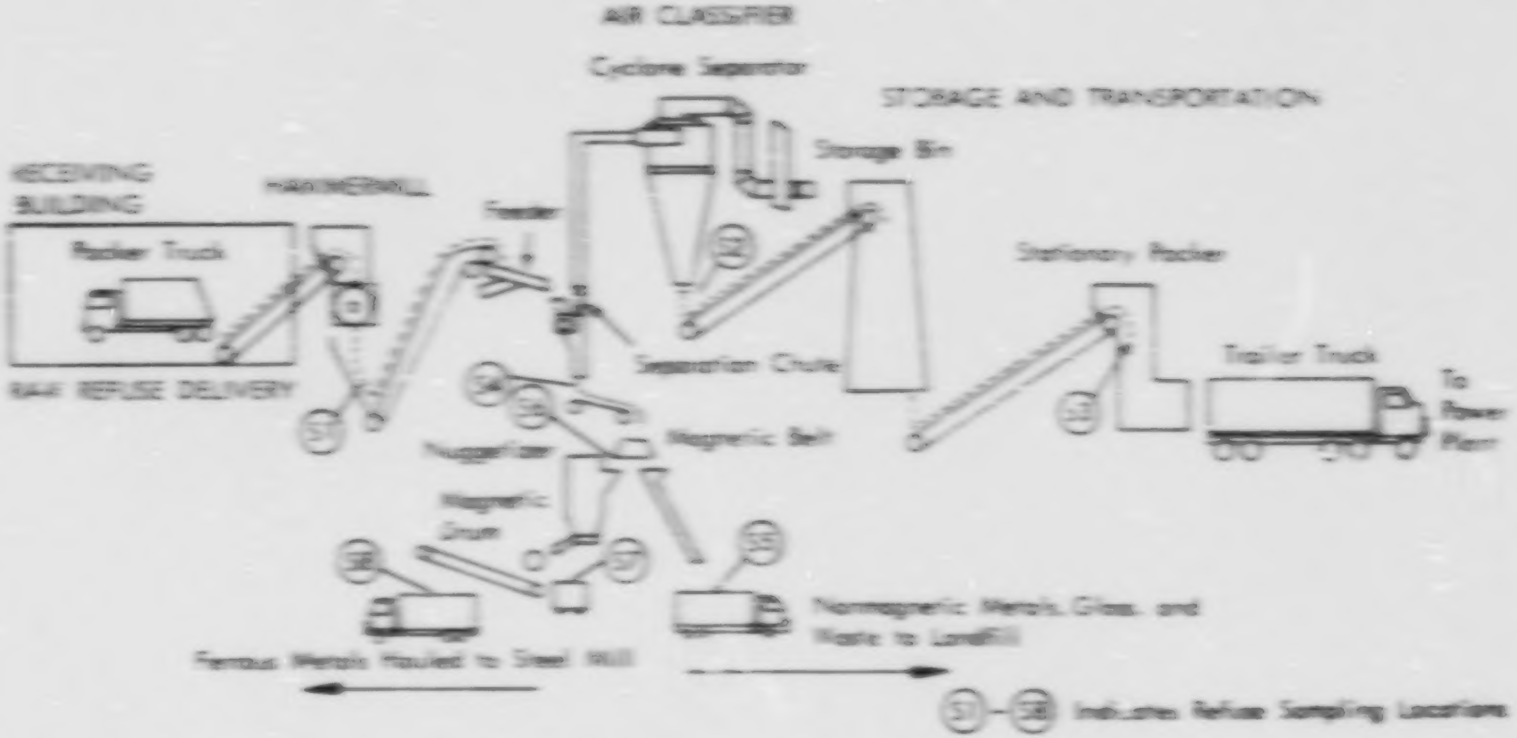
AIR CLASSIFIER
Cyclone Separator
STORAGE AND TRANSPORTATION
Storage Bin
RECEIVING BUILDING
HAMMERMILL
Feeder
Packer Truck
Stationary Packer
S2
Separation Chute
Trailer Truck
RAW REFUSE DELIVERY
S4
S6
S3
To Power Plant
S1
Nuggetizer
Magnetic Belt
Magnetic Drum
S8
S7
S5
Nonmagnetic Metals, Glass, and Waste to Landfill
Ferrous Metals Hauled to Steel Mill
S1 – S8 Indicates Refuse Sampling Locations

Figure 1. Flow diagram of processing facility and material sampling locations

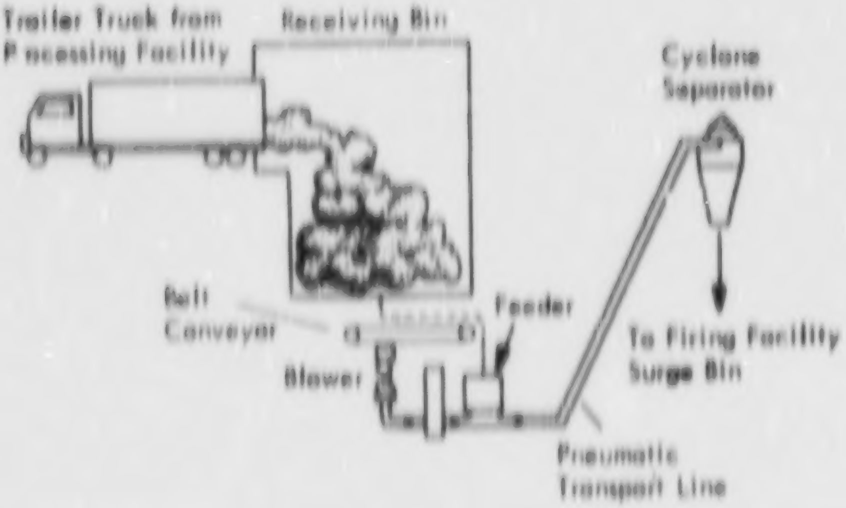
Trailer Truck from
Processing Facility
Receiving Bin
Cyclone
Separator
Belt
Conveyor
Feeder
To Firing Facility
Surge Bin
Blower
Pneumatic
Transport Line

Figure 7. Flow diagram of refuse fuel-receiving facility at Union Electric Company's Meramec Power Plant

Table 1. SAMPLING AND ANALYTICAL PROGRAM

(Continued)

September 23, 1974, through October 4, 1974

(Three Daily Samples Taken to Form Daily Composite Sample)

Stream identification	Moisture	Ash	Bulk density	Size	Heating value	Proximate analysis	Ultimate analysis	Composition[a]	Metals analysis
11 - [illegible]	X	X	X	X	X			X	b/
12 - [illegible]	X	X	X	X	X	X	X	X	c/
13 - [illegible]	X	X	X		X	X	X	X	b/
14 - Air classifier bottoms	X		X	X	X			X	b/
15 - Magnetic belt rejects	X		X	X	X			X	b/
16 - [illegible] feed	X		X	X				X	b/
17 - [illegible]	X		X		X			X	b/
18 - Ferrous metal by-product	X		X	X	X			X	b/

---

a/ Composition for ... - paper, plastic, wood, glass, magnetic metal, other metal, organics, miscellaneous.

b/ Chemical analyses to determine percent Fe, Al, Cu, Pb, Ni, and Zn.

c/ Visual analysis for metallic components for 1 - tin cans, ferrous metal, Al, and Cu.

X - Analysis performed on daily composite sample.

Table 4. SAMPLING AND ANALYSIS PERFORMED

(Baseline II)

(October 1, 1974, through October 31, 1974, and March 24, 1975, through September 5, 1975)

(Four daily samples taken to form daily composite and weekly composite sample)

Stream identification	Moisture	Ash	Bulk density	Size	Heating value	Proximate analysis	Ultimate analysis	Composition[a]	Metals analysis
10 - Hammermill discharge	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
17 - Cyclone separator bottoms	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23 - Magnetic belt rejects	[illegible]		[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
31 - Magnetic drum rejects[b]	[illegible]		[illegible]		[illegible]			[illegible]	[illegible]
39 - [illegible] metal by-products	[illegible]		[illegible]	[illegible]	[illegible]			[illegible]	[illegible]

---

[a] Composition (wt %) - paper, plastic, wood, glass, magnetic metal, other metal, organics, miscellaneous.

[b] [illegible] samples not taken during October 1 through 31, 1974.

[c] Chemical analyses to determine percent [illegible]

[d] Visual analysis for metallic components (wt %) - [illegible]

D - Analysis performed on daily composite sample.

W - Analysis performed on weekly composite sample.

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Table 4. SAMPLING AND ANALYSIS PERFORMED
(Baseline II)
November 28, 1976, through March 11, 1977
(Two Daily Samples Taken to Form a Weekly Composite Sample)

Stream identification	Moisture	Ash	Bulk density	Size	Heating value	Proximate analysis	Ultimate analysis	Composition[a]	Metals analysis
S1 - Hammermill discharge	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible][b]
S2 - Cyclone separator bottoms	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible][b]
S3 - Magnetic belt rejects	[illegible]		[illegible]	[illegible]	[illegible]			[illegible]	[illegible][c]
S4 - Magnetic drum rejects	[illegible]		[illegible]		[illegible]			[illegible]	[illegible][c]
S5 - Ferrous metal by-products	[illegible]		[illegible]	[illegible]	[illegible]			[illegible]	[illegible][c]

---

[a] Composition for % - paper, plastics, wood, glass, magnetic metals, other metals, organics, miscellaneous.
[b] Chemical analyses to determine percent Cu, Al, [illegible], Pb, Ni, and Zn.
[c] Visual analysis for metallic components for % - tin cans, ferrous metal, Al, and [illegible].
WC - Analysis performed on weekly composite sample.

EVALUATION OF FACILITIES

All the refuse sample analyses and plant operating data collected were compiled and analyzed with the aim of meeting the objectives of the equipment and facilities evaluation as listed previously in Table 1. The results have been summarized and are presented in the following sections of this report. Tabulations of associated data are presented in the four appendices as follows:

- Appendix A - Description of Plant Equipment and Plant Costs;
- Appendix B - Characterization of Plant Input/Output Streams;
- Appendix C - Environmental Test Procedures and Data; and
- Appendix D - Statistical Evaluation of Process Stream Samples.

PLANT OPERATIONS

A daily log of plant production rates and plant activity during the test period is presented in Appendix Table A-9. A weekly summary of the daily plant activity is contained in the following Table 5. Because the bulk of the plant equipment is located outside, ambient temperature and humidity were recorded (Figure 3) for each test day to show the environment in which the equipment was operating.

Of the 53 weeks comprising the test period, plant production of refuse derived fuel (RDF) occurred during 45 weeks, leaving a balance of 8 weeks with no production because of the following reasons.

Table 5. PROCESSING PLANT WEEKLY ACTIVITY
(Average Raw Refuse Processed to Storage the Days Plant Is Processing, Not Each Days The Week)

Week of production (No.)	Date 1974 Month	Date 1974 Day	Weekly average raw refuse processed Mg/day	Weekly average raw refuse processed Mg/hr	Days plant not processing No.	Days plant not processing Reason
1	9	23	[illegible]	[illegible]		
2	9	30	[illegible]	[illegible]		
3	10	7	[illegible]	[illegible]		
4	10	14	[illegible]	[illegible]	1	Holiday
5	10	21	[illegible]	[illegible]		
6	10	28	[illegible]	[illegible]	2	Holiday and maintenance
	11	4	0	0	5	Holiday and power plant maintenance
7	11	11	[illegible]	[illegible]	1	Holiday
8	11	18	[illegible]	[illegible]		
9	11	25	[illegible]	[illegible]	[illegible]	Holiday and ADS fan maintenance
10	12	2	[illegible]	[illegible]	[illegible]	Atlas bin bearing failure
11	12	9	[illegible]	[illegible]	[illegible]	Atlas bin bearing and ADS drag chain
	12	16	0	0	[illegible]	ADS drag chain failure
12	12	23	[illegible]	[illegible]	[illegible]	Holiday and ADS drag chain failure
13	12	30	[illegible]	[illegible]	1	Holiday
	1975					
14	1	6	[illegible]	[illegible]	1	Storage bin full
15	1	13	[illegible]	[illegible]	[illegible]	Holiday and maintenance
16	1	20	[illegible]	[illegible]		
17	1	27	[illegible]	[illegible]	1	Storage bin full
18	2	3	[illegible]	[illegible]	1	Storage bin full
19	2	10	[illegible]	[illegible]	1	Holiday
20	2	17	[illegible]	[illegible]	[illegible]	Holiday and Atlas bin hydraulic system
	2	24	0	0	[illegible]	Atlas bin hydraulic system + flush
21	3	3	[illegible]	[illegible]	1	Power plant maintenance
22	3	10	[illegible]	[illegible]	1	Power plant maintenance
23	3	17	[illegible]	[illegible]	[illegible]	Maintenance
24	3	24	[illegible]	[illegible]		
25	3	31	[illegible]	[illegible]		
26	4	7	[illegible]	[illegible]		
27	4	14	[illegible]	[illegible]	1	ADS cyclone maintenance
28	4	21	[illegible]	[illegible]	[illegible]	Power plant maintenance
29	4	28	[illegible]	[illegible]		
30	5	5	[illegible]	[illegible]	[illegible]	Holiday and power plant maintenance
31	5	12	[illegible]	[illegible]	[illegible]	Receiving building cross conveyor bearing failure
32	5	19	[illegible]	[illegible]	[illegible]	Hammermill electrical connection failure
	5	26	0	0	[illegible]	Hammermill electrical connection failure
	6	2	0	0	[illegible]	Hammermill electrical connection failure
33	6	9	[illegible]	[illegible]	[illegible]	Maintenance
34	6	16	[illegible]	[illegible]	[illegible]	Maintenance
35	6	23	[illegible]	[illegible]	[illegible]	Repair of electric power substation
36	6	30	[illegible]	[illegible]	1	Holiday
37	7	7	[illegible]	[illegible]		
38	7	14	[illegible]	[illegible]	1[a]	Strike at power plant
39	7	21	[illegible]	[illegible]	[illegible]	Strike at power plant
40	7	28	[illegible]	[illegible]	[illegible]	Strike at power plant
41	8	4	[illegible]	[illegible]	[illegible]	Strike at power plant
42	8	11	[illegible]	[illegible]	[illegible]	Strike at power plant
43	8	18	[illegible]	[illegible]	[illegible]	Strike at power plant
44	8	25	[illegible]	[illegible]	[illegible]	Hammermill maintenance
45	9	1	[illegible]	[illegible]	[illegible]	Holiday
	9	8	0	0	[illegible]	Strike at power plant
	9	15	0	0	[illegible]	Strike at power plant
	9	22	0	0	[illegible]	Strike at power plant
	9	29	[illegible]	[illegible]	[illegible]	Strike at power plant (9/30 is end of 1-year test and evaluation program; this date selected because of convenience for plant accounting purposes.)
Total average for 45 weeks of production			[illegible]	[illegible]		
Maximum value			[illegible]	63.8		
Minimum value			[illegible]	10.6		

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[a] Strike at power plant commenced Sunday, July 13, 1975; this greatly reduced refuse processing plant operations because all RDF produced after that date was landfilled.

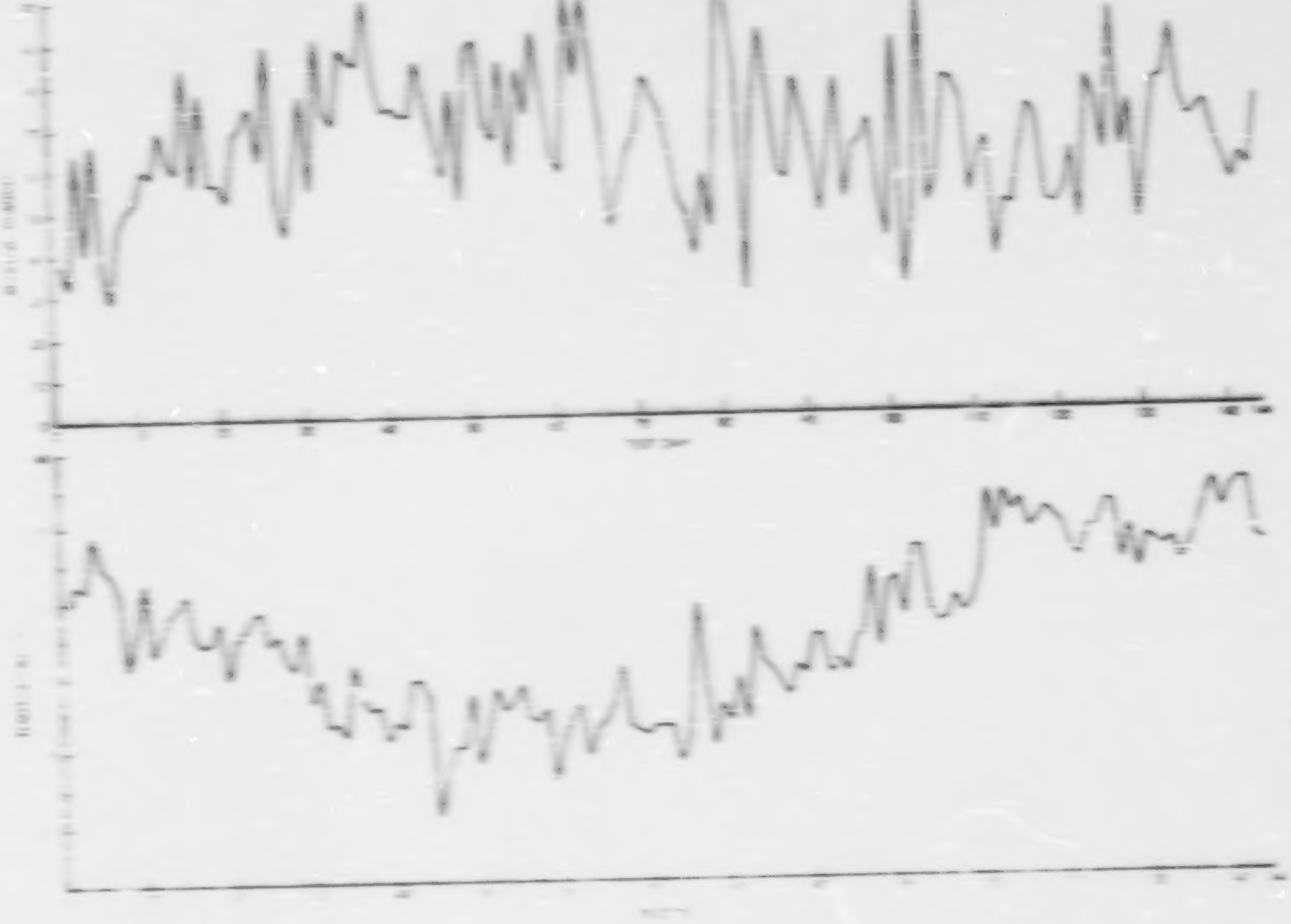

Figure 1. Daily variations in midday ambient temperature and relative humidity

No. of weeks	Reason for no plant production of RDF
1	Strike at Union Electric Power Plant
2	Hammermill electrical failure
1	Hydraulic system failure - storage bin (Atlas bin) at power plant
1	Failure of ADS drag conveyor
1	Planned maintenance outage at power plant

Production did not occur on every day of every week of production. During the total test period there were 259 days available for processing. Processing operations were actually conducted for 158 days, yielding a 61% use factor for the processing plant. The reasons for no processing operations for individual days are shown in Appendix Table A-9.

The average weekly plant processing rates summarized in Table 5 have been plotted on Figure 4 to depict fluctuations. The processing rates are based on actual time the plant operated (i.e., not including downtime).

Processing rate appears to decrease with a decrease in daily tonnage, although statistical analysis of the data yielded only a 43% correlation between megagrams per hour and megagrams per day. Processing rate is controlled by an operator's visual observation of the hammermill motor current via an ammeter. The operator's objective is to keep the hammermill operating as close as possible to the maximum motor current. Feed rate to the hammermill is controlled by a variable speed drive on the raw refuse receiving belt conveyor. The hammermill has a nominal capacity of 41 Mg/hr (45 tons/hr). The daily rates varied from 44 to 112% of this design rate, with the average being 76%. Any individual day may have a high processing rate; however, due to the variabilities of incoming raw refuse and the human operator's alertness, it would be difficult to greatly improve the average processing rate over a long time span. Therefore the tons of refuse processed are primarily a function of the number of hours the plant operates.

PLANT COSTS

Cost data for the 12 months of October 1974 through September 1975 and capital costs have been collected and summarized in Table 6. A detailed breakdown of this cost summary is shown in Appendix Tables A-6 through A-8. For evaluation purposes, the total refuse processing plant was categorized into two separate cost centers: the processing facility and the receiving facility.

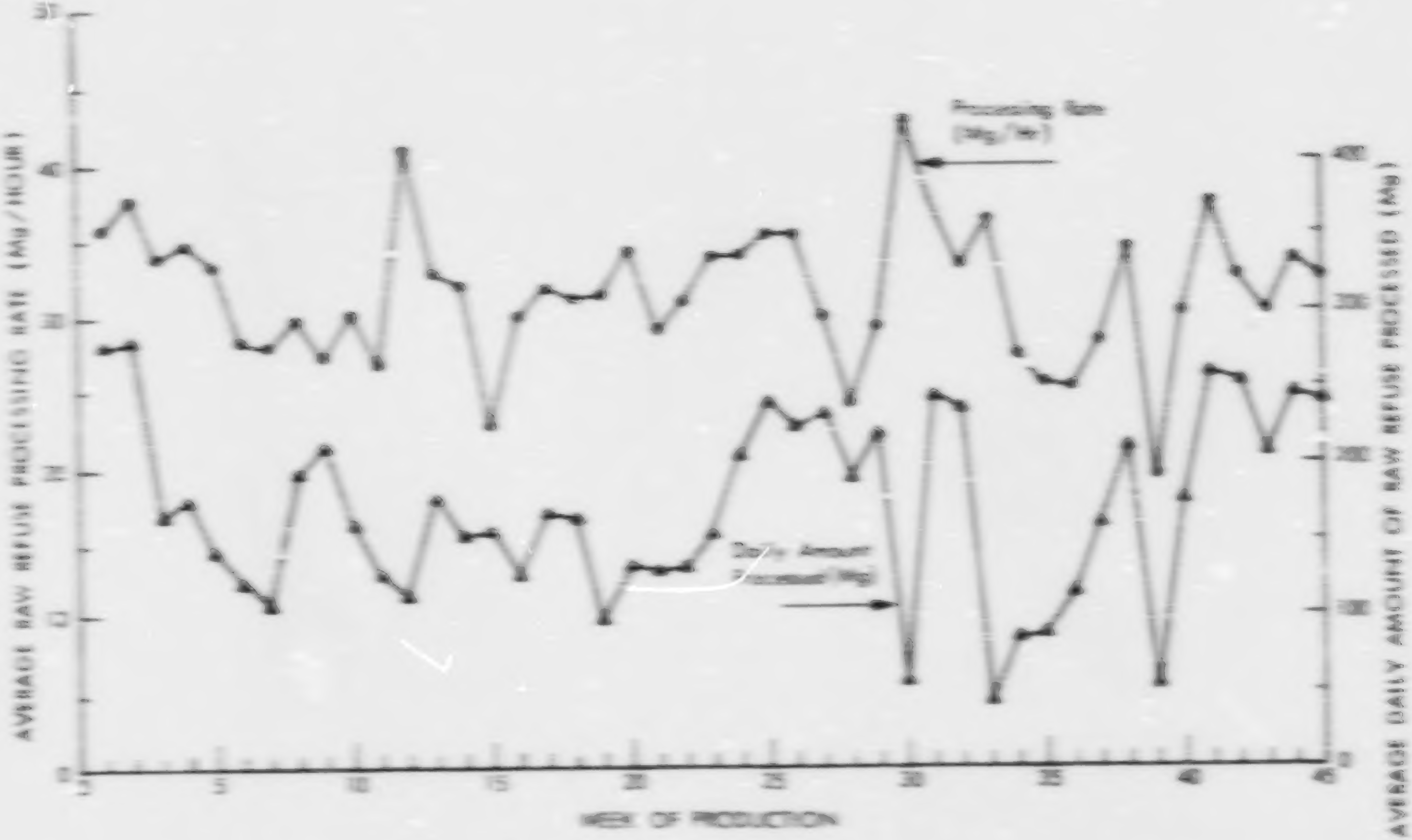

Figure 4. Variations in weekly average of daily amount and rates of raw refuse processed

The processing plant cost center includes all operations necessary to produce and store RDF. It includes as vehicles the front end loader used to push the raw refuse onto the receiving belt, dump trucks to haul away the Fe metal by-product and reject material, and the plant automobile and pickup truck. Also, it includes the storage bin and packer load-out station. Not included are the trucks used to transport RDF to the power plant.

The receiving facility cost center includes the transport trucks used to deliver RDF to the power plant and the receiving equipment necessary to unload the trucks and place RDF in Union Electric Company's storage bin.

The required cost information was obtained with the help of the City of St. Louis and was used to determine operating and capital expenses for the appropriate cost centers. All expenses incurred by the project were classified as labor, materials, or plant overhead and allocated to the Processing Facility or Receiving Facility.

Six days in September 1974, at the very start of the project, were not included because of inaccuracies in determining costs for less than a 1-month period, since all city records are kept on a monthly basis.

For comparison purposes, monthly costs were converted to dollars per megagram values. The preliminary report concerning the St. Louis processing plant[17] reported costs based on the quantity of refuse fuel (RDF) produced. However, other processing plants in the future undoubtedly will have RDF recovery rates different from the 81% found in the present study. All calculations presented here are based on the quantity of raw refuse received, resulting in values of dollars per megagram of raw refuse.

Monthly operating costs for the total processing plant on a basis of dollars per megagram of raw refuse received ranged from $4.45/Mg ($4.04/ton) to $57.99/Mg ($52.61/ton) with an average for the 12-month period of $8.26/Mg ($7.49/ton). This overall cost figure reflects several months of operation when the plant performed at considerably less than design capacity. Excessive downtime and maintenance, characteristic of any first generation project, occurred frequently during this period. The wide variability in unit cost is due largely to fluctuations in the volume of activity. For example, the month of June with the lowest volume of 127 Mg (1,200 tons) has the highest unit cost at $57.99/Mg ($52.61/ton) compared to April which has the highest volume of 4,856 Mg (2,470 tons) and the lowest unit cost at $4.45/Mg ($4.04/ton).

Labor expense comprises over one-half of the total operating costs and is in most instances fixed. These expenditures are incurred despite a large amount of idle time and uneven production schedules when employee services are not fully utilized. Relatively high maintenance labor costs and maintenance parts and supplies costs can be attributed to the newness of waste recovery technology. No breakdown of plant overhead into fixed and variable overhead components has been attempted; however, on a per-unit basis, these costs should be expected to vary inversely with volume changes.

The market value of ferrous metal recovered was $15,586, an average $28/Mg ($25/ton). This resulted in the lowering of the cost of operation. The ferrous metal sales have been included in the cost tables, producing a net operating cost.

Total dollar per megagram costs (total costs divided by total megagrams) for the 12-month test period are as follows:

Item	$/Mg ($/ton) of raw refuse received Total	 Lowest value
Plant utilization (%)	61.8	84.6
Operating costs		
Processing facility	6.00 (5.44)	2.95 (2.67)
Receiving facility	2.26 (2.05)	1.50 (1.39)
Total operating costs	8.26 (7.49)	4.45 (4.06)
Capital costs		
Processing facility	7.79 (7.07)	3.53 (3.21)
Receiving facility	1.60 (1.45)	0.72 (0.65)
Total capital costs	9.39 (8.52)	4.25 (3.86)
Total net processing plant costs	17.65 (16.01)	8.70 (7.89)

Figures 5 and 6 show the relationship between dollars per megagram and monthly weight received.

An analysis of Table 6 reveals capital costs that are fixed per month and therefore dollar per megagram capital costs are a direct function of monthly processing rates. In other words, the correlation is 100% as shown in Figure 5. The variable value is operating costs. Figure 6 shows the total dollar per megagram operating cost proportioned between the processing and receiving facility. The processing portion of the plant accounts for the major share of operating costs.

Statistical analysis of the data showed good correlation between costs and processing rate. Correlation coefficients ranged from 98 to 99%. These results

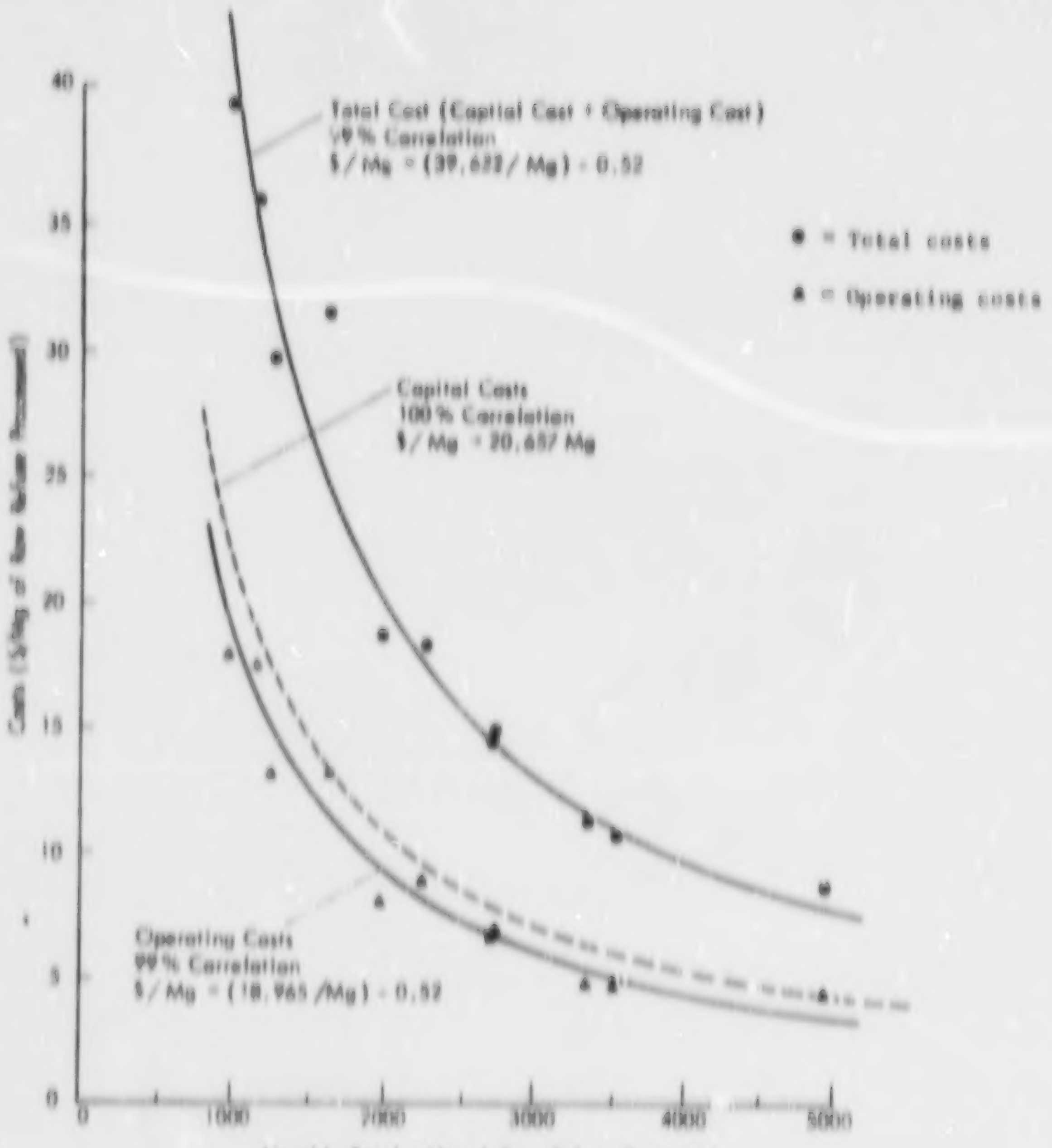

Figure 5. Total cost per megagram versus monthly total amount of raw refuse processed

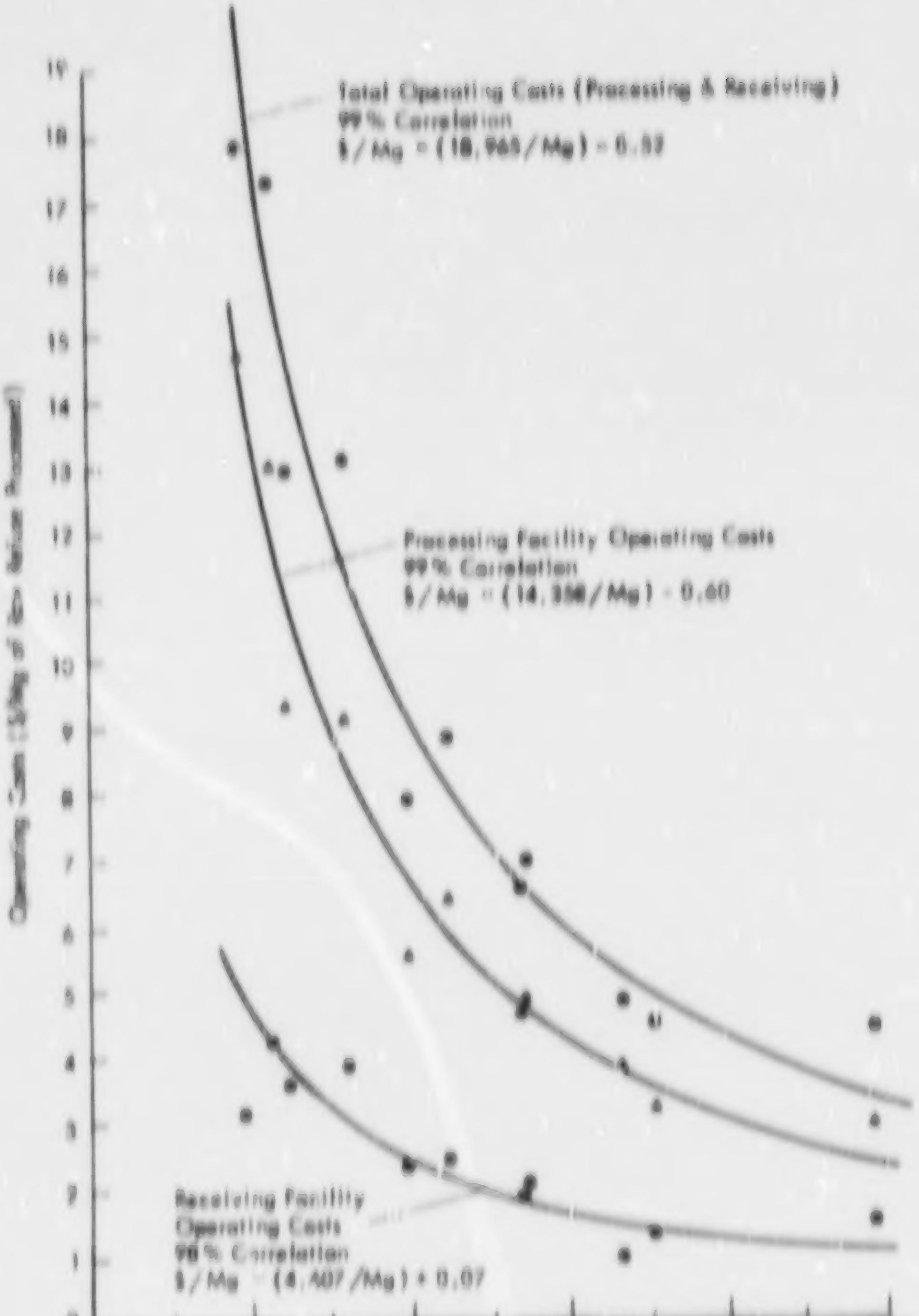

Figure 6. Operating costs per megagram versus monthly total amount of raw refuse processed

and the best fit curve equations corresponding to the correlation coefficients are shown in Figures 5 and 6. The curves are of the form:

$$\text{rate} = \frac{h_1}{Mg} + h_2$$

where h_1 and h_2 are constants.

The curves should not be used to predict results beyond the range of monthly processing rates shown. For example, a significant increase in amount processed may require more employees which would change the cost-curve equation.

The important conclusion is that the dollar per megagram rate of total costs is a function of amount processed. Lowest rates occur at the highest monthly processing rate. Therefore, a commercial plant operating at high plant-utilization percentages could be expected to have costs close to the lowest monthly value occurring at St. Louis when plant utilization was 84.6%.

ELECTRIC POWER CONSUMPTION

Figure 7 shows the daily variations in electric power consumption expressed as kilowatt-hour per megagram of raw refuse processed. The daily results were quite variable because of the high variability in the daily amperage of the major motors. Comparison of the daily kW-hr/Mg for the hammermill versus Mg/hr processing rate yielded only a 52% statistical correlation which is too low a correlation to allow any reliable conclusions to be made. Any trends that might possibly exist are lost in the daily variation. As shown in Table 7, electric power used per month did not show the wide variability of the daily usage. Figure 8 is a graphical presentation of these data, showing that there is no trend of varying kilowatt-hour per megagram with monthly amount processed. Electric power consumption per megagram is a relative constant value as demonstrated by the statistical confidence interval or variability about the mean expressed in Table 7.

The hammermill is the single largest user of electric power, accounting for 61% of the total processing facility power consumption.

Electric power consumption at the receiving facility was not recorded. However the receiving facility has only 146 connected kilowatts compared to 1,748 connected kilowatts at the processing facility. Also, since the receiving facility operated on the average only 45 min/18-Mg (45 min/20 ton) truckload of RDF, it would not have a major effect on total power consumption.

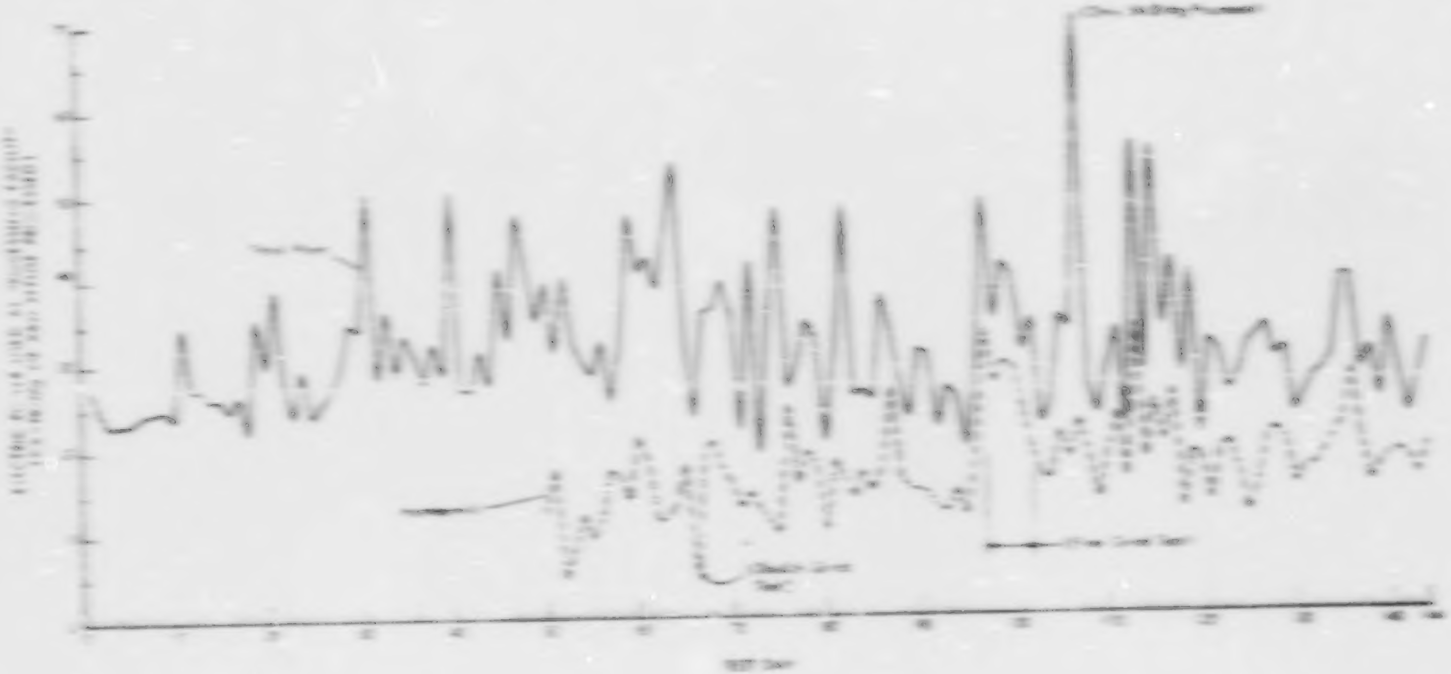

Figure 7. Daily variations in electric power consumption

Table 7. SUMMARY OF ELECTRIC ENERGY USED AT THE REFUSE PROCESSING FACILITY

		Electric power used			
		Total plant		Hammermill	
Month	Mg	kW-hr	kW-hr/Mg	kW-hr	kW-hr/Mg
September	1,668.0	40,320	24.2	NA	NA
October	3,471.6	89,760	25.[illegible]	NA	NA
November	1,950.4	34,330	1[illegible]	NA	NA
December	1,237.6	34,560	27.9	NA	NA
January	2,669.8	90,480	33.9	NA	NA
February	1,117.5	50,640	45.3	21,630	19.4
March	2,707.4	83,280	30.8	41,790	15.4
April	4,856.1	138,960	28.6	84,840	17.5
May	1,600.4	48,480	29.2	30,240	18.9
June	327.0	3,840	11.7	2,310	7.1
July	2,217.9	69,600	31.4	38,220	17.2
August	3,282.0	97,680	29.8	61,950	18.9
September	948.9	26,160	27.6	17,010	17.9
Total	28,052.6	808,080	28.8[a]	297,990	17.5[a]
Variability at 95% confidence coefficient			± 4.9		± 3.4

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[a] Total kW-hr divided by total Mg.

NA: data not collected.

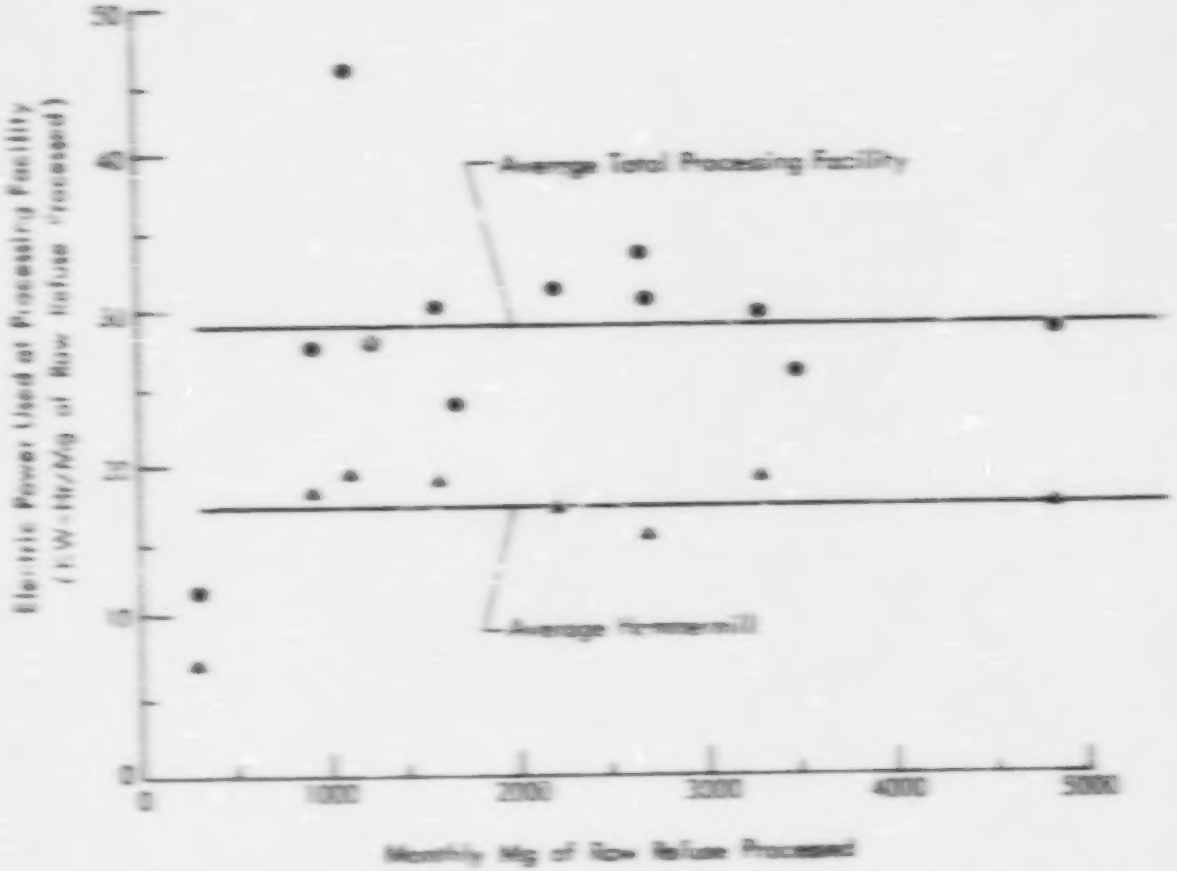

Figure 6. Electric power consumption versus total monthly amount of raw refuse processed

EQUIPMENT DOWNTIME AND MAINTENANCE

Table A-10 of Appendix A lists the plant downtime during processing days. Downtime represents incidents that caused the plant to cease operations at time periods when it would otherwise not be required. Therefore, the total weekly time required to handle a given amount of refuse is the sum of the actual processing time and the downtime.

Table A-11 of Appendix A lists the major items of maintenance performed that were not counted as downtime. Maintenance occurred either during the plant operating time, before or after the plant was actually processing refuse, or on the days when the plant was not processing refuse.

Two major plant breakdowns occurred during the test period. Ten days of downtime occurred in December 1974 because of a broken chain on the drag chain conveyor for the ADS system. Spare sections of this chain were not stocked at the processing plant, and this length of time was necessary to acquire new chain sections from the manufacturer and replace the old chain. Since St. Louis is a demonstration plant, this was not a serious problem. However, at a commercial refuse processing plant, an inventory of spare parts such as this ADS drag chain would be advisable.

The second major breakdown occurred in May 1975. The electrical lead wires to the hammermill motor came loose, burning out the lighting arrestors and oxidizing the first 3 m (10 ft) of lead wire. Thirteen days of downtime resulted while new lead wire and lighting arrestors were acquired and installed.

Another category which caused stoppage of refuse processing operations but cannot be counted against the processing plant is maintenance downtime and a lengthy strike at the Union Electric power plant. During the test period power plant maintenance accounted for 21 days and the strike 28 days of no operations at the processing plant.

Maintenance of the hammers in the hammermill was the single most important maintenance item at the processing plant. The St. Louis experience was that hammer wear due to refuse shredding is mainly an abrasion problem, but occasionally there is moderate impacting. A second shift welding crew was used to hardface the hammers on an as-needed basis. Two different types of hammers, both made of Hatfield manganese, were used. The original hammers were double faced and weighed approximately 95 kg (210 lb) each. The second type of hammer was single faced with a replaceable tip that is bolted onto a shank. This type weighs roughly 82 kg (180 lb) each.

Experience showed that the hammers could not be entirely maintained by the second shift crew. Buildup of the hammers in place in the hammermill was initially tried but this practice was discontinued for two reasons.

1. Significant buildup (i.e., welding material on the hammers) could not be done on all 30 hammers in one shift.

2. The balance of the hammermill rotor is lost when large amounts of buildup material are welded on individual hammers. Therefore, the only maintenance done on the hammers in the mill was hardfacing with 4.8- or 6.4-mm (3/16- or 1/4-in.) welding rod. A semiautomatic wire machine was tried, but the results were less satisfactory.

At 272 Mg/day (300 tons/day), a set of double-faced hammers must be hardfaced every day. One face will last at least 4,500 Mg (5,000 tons) and then can be turned around and the opposite face will last approximately the same amount of refuse processed. After 9,000 Mg (10,000 tons), the hammers were removed and sent to a welding shop where 9 to 14 kg (20 to 30 lb) of buildup welding wire was added to each hammer depending on the wear. Experience showed that this can be done at least four to five times without any appreciable change in the base metal of the double-faced hammers. The cost of rebuilding the hammers is roughly 60 to 70% of the cost of a new manganese hammer. A new hammer will last longer than a rebuilt hammer due to better wearing properties; however, new castings are sometimes difficult to obtain.

The replaceable tip hammers were also hardfaced every 272 Mg (300 tons). However, their life is much less than those of the double-faced hammers. This difference could be due to the fact that they are 14 kg (30 lb) lighter per hammer. Buildup of the replaceable tip hammers was done with a semiautomatic welding wire machine by the plant/maintenance personnel.

In order to use the welding wire on the replaceable tips, it was found necessary to form a mold by placing 25-mm (1-in.) carbon plates around the tips to keep the welding wire from flowing off the sides of the tips. After the tips have been built up, the carbon plates are removed and the sides filled to seal any gaps between layers. It was necessary to set up at least two tips and alternately weld between hammer tips to minimize heat buildup. A maximum of two tips per 8-hr day is the most that one man can be expected to rebuild because of set up time of the jigs and the cooling time required to avoid overheating of base metal.

The configuration of the replaceable tips caused various problems. If the end of the retaining bolt was exposed to impact, they were difficult to remove. This bolt must be tightened regularly even though it has a lock-washer. The tip itself wears more rapidly than a comparable two-sided hammer. In addition, excessive wear can expose the head of the bolt that secures the tip, allowing it to fly off during operation.

Various buildup and hardfacing materials were tried. A summary of these materials and their properties is shown below. Basically the plant experience has been that for building up hammers, Stoody Dynamang rod and McKay 218-O welding wire, 2.8-mm (7/64-in.) diameter, have worked well. They are both well suited for use on manganese. When set at its higher amperage rating, the McKay alloy gives good penetration and very little slag. For hardfacing, either Amsco K-53 or McKay 55 TIC were used. They both have very similar wearing properties. The Amsco is more difficult to weld but is less expensive. Generally, only one welding pass was used due to the time involved.

The four products mentioned above are those that were selected from the various materials tried at the St. Louis plant and should not be interpreted as being recommended for use over other products which may be available.

The various alloys tried are as follows:

Buildup Alloys

McKay 218-0 Wire

Low phosphorus austenitic manganese, 19.5% alloy steel, work hardens to 50-55 Rc--as deposited 17 Rc, nonmagnetic.

Stoody Dynamang Rod

Hobart 175 Tufanhard Rod

Deposit hardness 29-60 Rc, abrasion resistance in medium impact conditions, deposit analysis--0.23 C, 0.69 Mn, 0.21 Si, 2.32 Cr, and 0.18 Mo.

Hardfacing Alloys

Amsco K-53 Rod

Micro structure--chromium carbides and austenite nominal deposit analysis--1.5 C, 16% Cr, 1.0% Mo; deposit hardness--50-56 Rc, magnetic for abrasion and impact.

McKay 55-TIC Rod

38% alloy of high chromium cast iron, 11% titanium carbides, deposit hardness--40-50 Rc for severe abrasion and moderate impact.

Amsco Superchrome Rod

Large volume of chromium carbides and austenite nominal deposit analysis--4.5% C, 1.0% Si, 30.0% Cr; deposit hardness--56-61 Rc for sliding abrasion and moderate impact.

Large volume of complex carbide and martensite, nominal deposit analysis--6.0% C, 22% Cr, 7% Mo, 5% W; deposit hardness--60-65 Rc for severe abrasion.

McKay 258 TIC-O Wire

Moderate carbon-chromium 17% alloy steel with 11% titanium carbides, deposit hardness--36-58 Rc, strongly magnetic.

Other alloys that were used but no specifications were available.

Stoody Borod Rod

X-Ergon

Vulcanalloy 217

Fleet Rod

CHARACTERIZATION OF PLANT EQUIPMENT

The refuse processing facility is made up of several major pieces of equipment as well as many conveyors, etc. In order to characterize these items, their physical characteristics are described in Appendix A (Table A-1). Since most of the items of equipment are electrically driven, the electrical characteristics of each have also been tabulated in Appendix A (Table A-2). By far, the largest power users are the 933-kW (1,250-hp) hammermill, the 149-kW (200-hp) ADS fan, a 112-kW (150-hp) storage bin discharge screw conveyor, and the 75-kW (100-hp) nuggetizer. The nuggetizer is a rotary mill used to increase the bulk density of the ferrous metal scrap by-product. As discussed in the preceding section on electric power consumption, the hammermill accounted for 61% of total electric power consumption.

Corresponding data for the refuse receiving facility at the power plant are shown in Appendix A (Tables A-4 and A-5). All motors, except the hammermill, and the blower for the pneumatic-conveying line at the receiving facility operated at less than their full load current rating. The hammermill, storage bin discharge screw conveyor, nuggetizer, and air density separator (ADS) fan motor currents were measured daily because of their large size and possible varying load. Figure 9 depicts these daily readings.

Daily amperage recordings were not made at the receiving facility because this equipment did not operate on a continuous basis. When a truckload of RDF was discharged into the receiving hopper, a timed control circuit was manually energized to operate the equipment for 45 min, which was sufficient time to con-

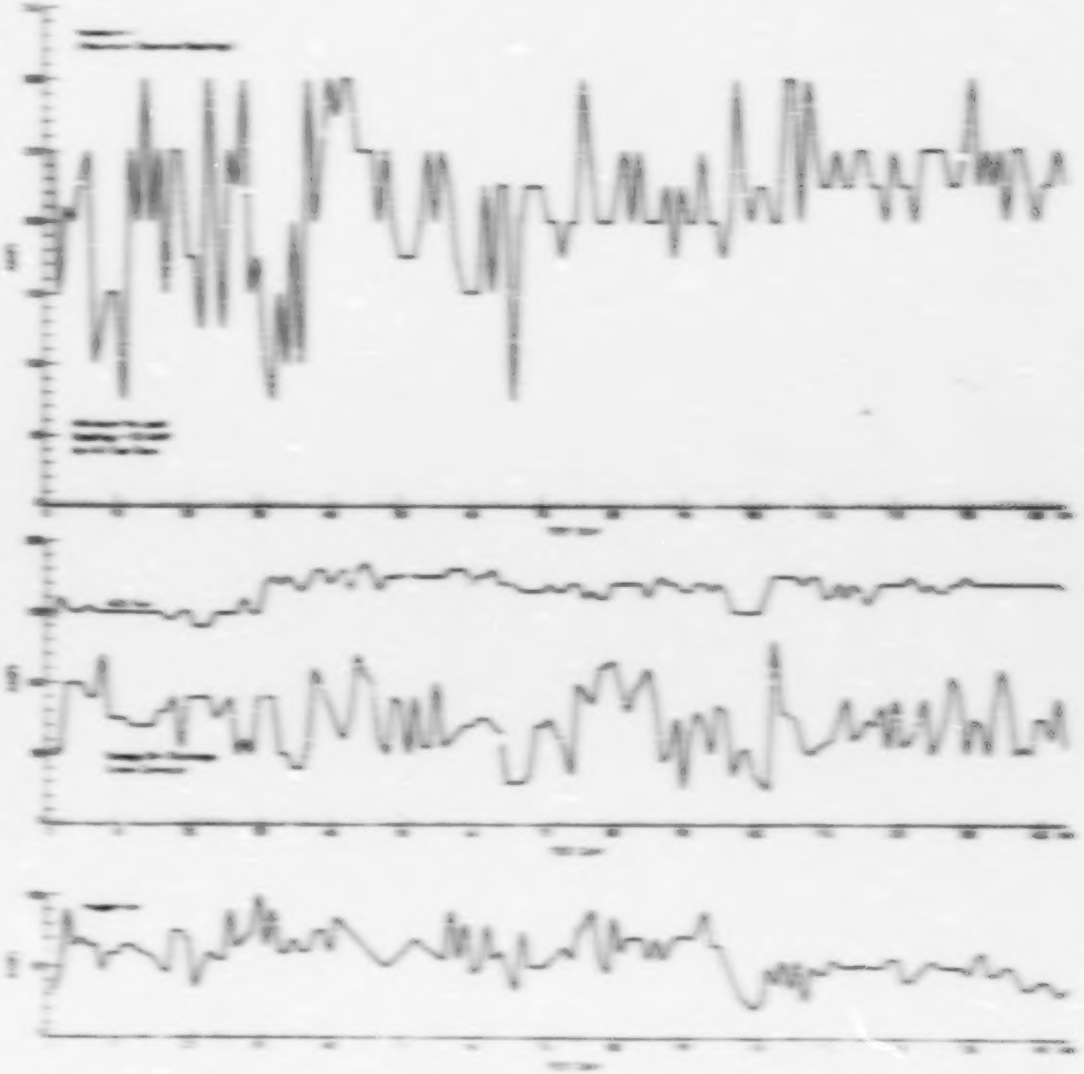

Figure 9. Daily variations in motor current

vey the RDF to the power plant storage bin. The actual conveying time required was approximately 30 min, allowing 15 min for cleanout of the conveying equipment before shutdown.

Hammermill current oscillated rapidly because of the varying composition of the incoming raw refuse. Also, the large mass of the mill rotor acts as a flywheel. Large pieces of metal or other hard-to-mill refuse in the stream tend to slow the rotor speed, causing a rapid increase in motor current. By the time the motor current peaks, the hard-to-mill refuse has passed the mill, but the rotor coasts because of its flywheel effect, which in turn causes a quick decrease in motor current. The motor electric power circuit is fitted with a dial ammeter. It is possible to read the high and low points of the fluctuating meter dial. However, it was impossible to determine average current draw from this meter. Therefore, the maximum amperage was recorded and is shown in Figure 9. The minimum amperage was always 50 amps. Rated motor current is 155 amps, while the actual current varied between 50 and 300 amps. At no time did the current stay above 155 amps long enough to trip the motor overload protection circuit. To determine hammermill power consumption, the kilowatt-hours used each day were recorded since January 22, 1975.

The hammermill bearings are of prime interest since a major plant shutdown had occurred before the start of the test period due to a bearing failure. Bearing skin temperature is an indication of upcoming bearing failure. Therefore, daily skin temperatures were recorded and are reported in Figure 10. The bearing manufacturer considers 79°C (175°F) as the maximum safe skin temperature. The highest temperature reached during the test period was 72°C (162°F). The trend is for the outboard bearing away from the motor to run a few degrees hotter, perhaps because it is the newest bearing, having been replaced after the previous bearing failure, and therefore it had not worn in as much as the older bearing. However, because the mill rotor is directly coupled to the motor shaft, the motor bearings may be supporting a small amount of the inboard bearing load, causing cooler inboard bearing temperatures.

ADS air flow rates were monitored daily by measuring the pressure drop across a fixed orifice plate which was calibrated during the plant environmental tests. Wet and dry bulb temperature readings were taken to determine ambient and ADS air discharge relative humidity. This information is reported in Figure 11. Relative humidity was always above ambient in the fan discharge, showing that the ADS system picks up moisture from the refuse as it passes through the air stream.

The relative humidity of the hammermill dust collection cyclone exhaust was also recorded on 12 different days and found to be 100% at all times. Therefore, there is also a moisture loss from the refuse as it passes through the hammermill, adding to the material weight loss. A complete listing of all daily recordings of kilowatt-hours, amps, temperatures, and air flow is contained in Appendix A (Tables A-12 and A-13).

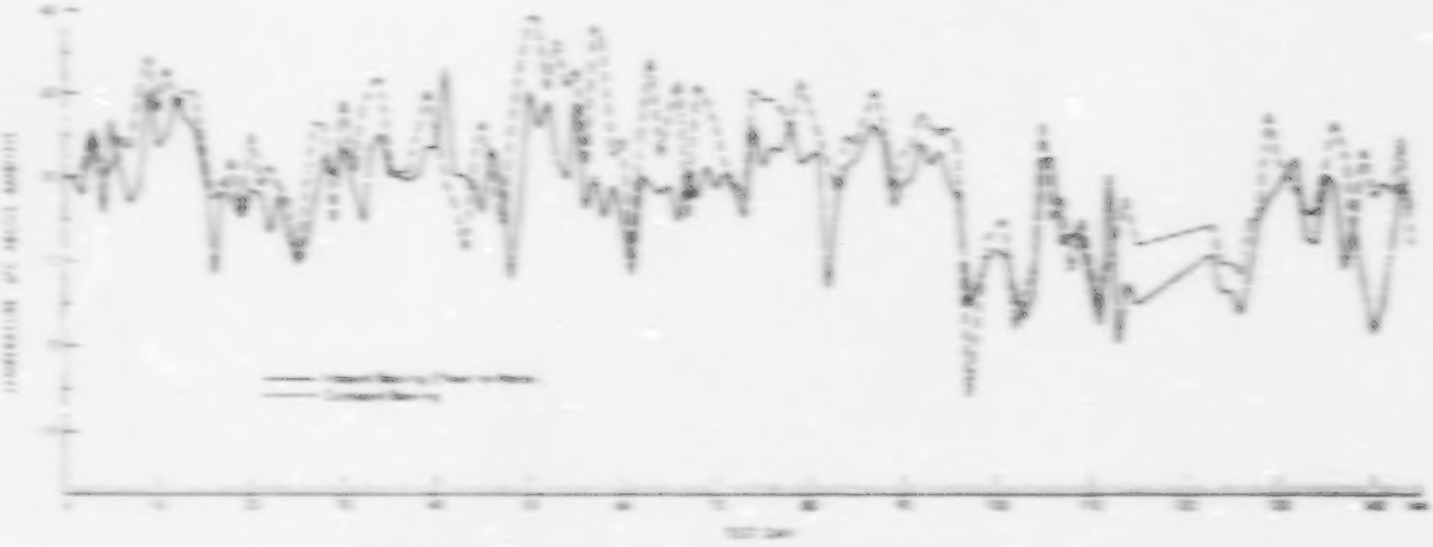

Figure 10. Daily variations in increase of hammermill bearing skin temperatures above ambient temperature

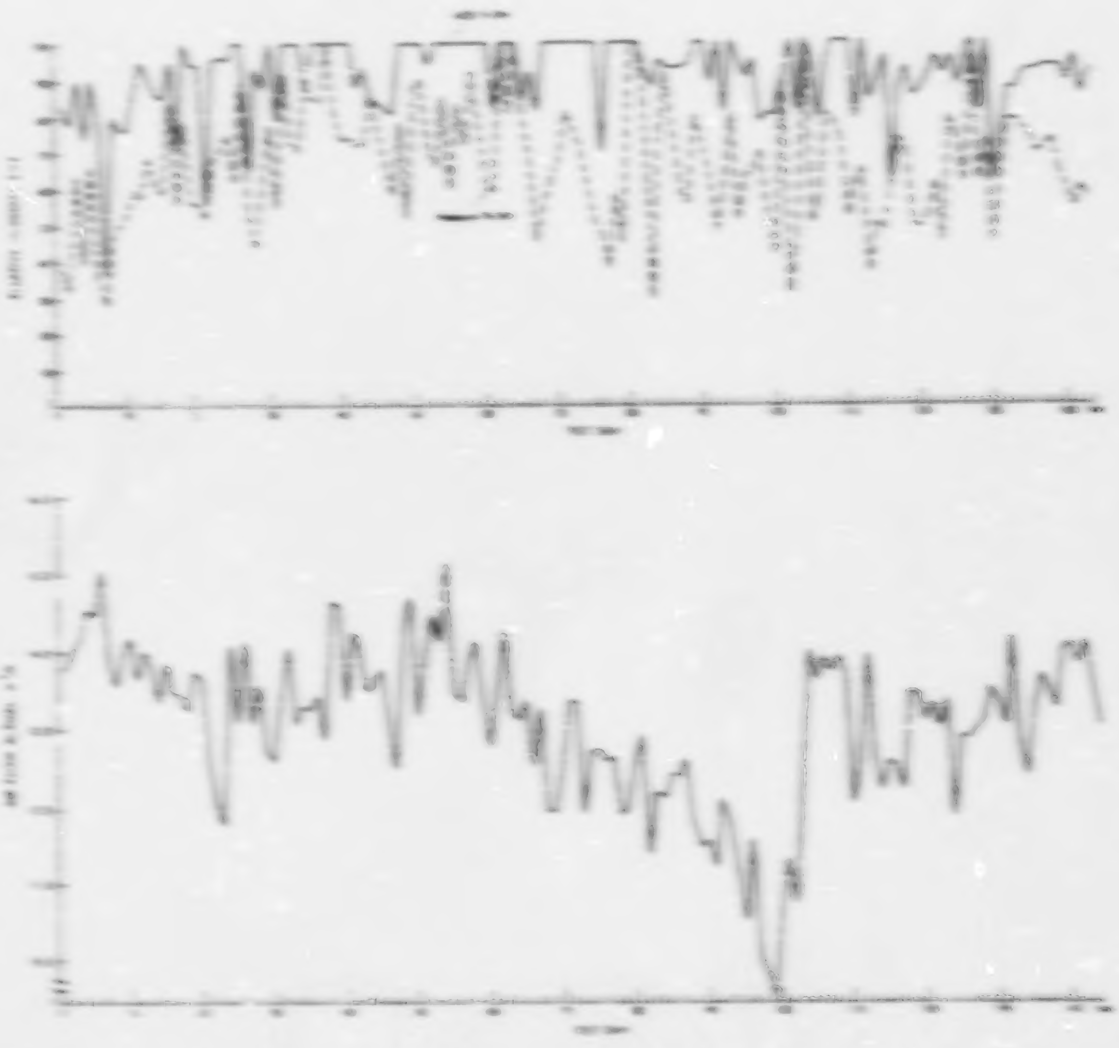

Figure 11. Daily variations in ABS cyclone exhaust in air flow rate, relative humidity, and ambient relative humidity

PLANT MATERIAL FLOW AND CHARACTERIZATION

Material flow through the plant is defined by eight different flow streams. Each stream was given a number to aid in sample identification. Table 8 presents a description of the eight material streams and the point at which they were sampled (also see Figure 1).

A daily record was kept of the quantity of all input/output streams for the purposes of making plant material balances. Also, as previously mentioned, samples of each stream were obtained for the purpose of characterizing these streams.*

CHARACTERISTICS OF ALL FLOW STREAMS

Results of this work are recorded in the form of weekly summaries of tonnage and stream characteristics in Appendix B (Tables B-1a through B-1ff. Weekly summaries of the proximate and ultimate analyses of RDF are presented in Table B-2. The total material amounts and overall average values for the test period are presented in the following Tables 9 and 10.

The actual weight of the storage bin discharge (S3), magnetic belt rejects (S5), magnetic drum rejects (S7), and ferrous metal by-products (S8) was determined. The amount of RDF produced each day (S2) was calculated from the S3 shipments and the storage and packer bins daily beginning and ending inventories.

Tables B-1a through B-1ff list quantities for the mill discharge (S1). However, this is actually the total of the raw refuse truck weights delivered to the processing plant. As discussed previously, the samples of raw refuse were taken after it had passed through the hammermill. Therefore, the S1 quantities are for raw refuse, while the sample analysis results are for milled raw refuse.

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* For additional discussion of certain process stream samplings, see Appendix D, "Statistical Process Evaluation of Process Stream Samples."

Table 5. PLANT FLOW STREAM DESCRIPTION

Stream	Description	Sampling point
S1 Mill discharge	Milled refuse dischrge from hammermill.	Discharge of milled refuse belt conveyor into ADS, surge bin.
S2 Cyclone discharge (RDF)	Refuse derived fuel (RDF) produced. ADS system lights or air flow supported portion of the air classified milled refuse.	Discharge of refuse fuel belt conveyor into storage bin.
S3 Storage bin discharge	Refuse fuel discharged from storage bin and conveyed to truck packer.	Discharge of storage bin load out belt conveyor into packer bin.
S4 ADS heavies	That portion of the milled refuse not supported by air flow in the air density sepration system.	Discharge of ADS air column onto belt conveyor
S5 Magnetic belt rejects	That portion of S4 not removed by the magnetic belt and is taken to the city landfill.	Discharge of material from reject hopper into receiving truck.
S6 Nuggetizer feed	That portion of S4 that can be magnetized.	Discharge of magnetic belt conveyor into nuggetizer receiving chute.
S7 Magnetic drum rejects	Product coming from the nuggetizer not removed by the magnetic drum.	Material in reject pile on concrete slab below magnetic drum.
S8 Ferrous metal	Steel scrap by-product sold to steel mill.	Discharge of Fe metal belt conveyor into receiving truck.

Table 9. AVERAGE CHARACTERISTICS OF PROCESSING PLANT FLOW STREAMS OVER DURATION OF SAMPLING
(Arithmetic mean of all sample analysis over test period)

	September 23, 1976, through September 3, 1975				
	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
Quantity (Mg/d)	18,082.6	12,611.1	2,019.5	89.7	1,268.2
Heating value (kJ/kg)	10,656	11,117	5,080	6,686	5,237
Bulk density (kg/m³)	133	56	637	1,013	880
Moisture (wt. %)	26.43	23.25	13.75	0.33	0.33
Composition (wt. %)					
(as received)					
Paper	56.1	61.8	1.5	0.01	[illegible]
Plastic	5.5	5.5	1.6	0.6	0.01
Wood	2.2	2.7	4.6	0.1	0
Glass	5.2	2.9	27.5	0.1	0
Magnetic metal	6.2	3.2	18.9	88.8	99.7
Other metals	0.6	1.38	5.7	5.6	0.1
Organics	5.8	1.8	22.3	0.06	0.01
Miscellaneous	21.5	22.3	18.0	1.05	0.18
Chemical analysis (wt. %)					
Ash	23.19	20.85			
Fe (Fe_2O_3)	1.33	0.98			
Al (Al_2O_3)	1.61	1.60			
Cu (CuO)	0.03	0.06			
Pb (PbO)	0.06	0.05			
Ni (NiO)	0.02	0.04			
Zn (ZnO)	0.08	0.07			
Visual analysis (wt. %)					
Fe			3.13	17.71	14.13
Tin cans			15.08	59.71	85.23
Al			0.17	9.81	0.10
Cu			0.66	0.63	0.01
Sieve (mm)					
Percent larger than 63.5	1.1	1.1	1.7		0
Percent less than 63.5	98.9	19.5	98.3		100.0
Percent less than 38.1	85.3	15.0	81.9		99.3
Percent less than 19.1	73.3	3.5	51.3		57.0
Percent less than 9.5	67.7	7.1	30.0		9.2
Percent less than 4.8	40.3	1.6	8.1		1.0
Percent less than 2.0	18.5	0.6	3.5		0.2
Particle size					
Geometric mean diameter (mm)	8.1	1.8	15.2		18.5
Geometric standard deviation	2.75	2.75	2.11		1.38

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Table 5. (Concluded)

	September 23, 1976, through October 1, 1976		
	S1 Storage bin discharge	S5 [illegible]	S6 Magnetics feed
Quantity (Mg)[a]	2,117.3	387.1	137.2
Heating value (kJ/kg)	11,000	2,281	-
Bulk density (kg/m³)	170	618	632
Moisture (wt. %)	21.19	3.86	0.31
Composition (wt. %) (as received)			
Paper	61.3	1.5	0.1
Plastic	4.7	2.9	0.1
Wood	[illegible]	2.8	0
Glass	[illegible]	3.5	0
Magnetic metals	[illegible]	69.1	99.6
Other metals	[illegible]	3.8	Tr
Organics	[illegible]	7.5	0
Miscellaneous	[illegible]	7.4	0.2
Chemical analysis (wt. %)			
Ash	17.19		
Fe (Fe_2O_3)	[illegible]		
Al (Al_2O_3)	[illegible]		
Cu (CuO)	[illegible]		
Pb (PbO)	[illegible]		
Sn (SnO_2)	[illegible]		
Zn (ZnO)	[illegible]		
Chemical analysis (wt. %)			
Fe		9.18	12.22
Tin cans		10.01	65.18
Al		2.50	0.05
Cu		0.40	0.003
Size (mm)			
Percent larger than 71.1		1.9	1.2
Percent less than 51.5		50.1	19.0
Percent less than 38.1		11.0	60.6
Percent less than 17.1		25.1	11.2
Percent less than 9.5		9.6	1.0
Percent less than 4.8		3.0	0.4
Percent less than 2.4		1.5	0.2
Particle size			
Geometric mean diameter (mm)		72.1	78.2
Geometric standard deviation		1.92	1.16

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a/ Total [illegible] for entire sampling period (September 23, 1976, through September [illegible], 197[illegible]).
b/ Total [illegible] for sampling period (September 23, 1976, through October 1, 1976).

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Table 10. AVERAGE PROXIMATE AND ULTIMATE ANALYSIS OF RDF (STREAM S2) OVER DURATION OF SAMPLING;
SEPTEMBER 23, 1974, THROUGH SEPTEMBER 5, 1975
(All results received moisture basis)

	RDF Stream S2 cyclone discharge	Orient 6 coal average of 21 samples collected October 31 through November 7, 1974	RDF as percent of coal
Heating value (kJ/kg)	11,167	26,910	41.5
Moisture (%)b/	25.25	12.50	202
Ash (%)	20.85	7.61	274.0
Volatile matter (%)	44.75	33.11	135.2
Fixed carbon (%)	9.15	46.78	19.6
Carbon (%)	27.36	66.36	41.2
Hydrogen (%)a/	4.03	5.20	77.5
Oxygen (by difference) (%)a/	22.12	5.61	394.3
Sulfur (%)	0.18	1.57	11.5
Nitrogen (%)	0.51	1.45	35.2

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a/ Reported hydrogen and oxygen does not include hydrogen and oxygen contained in the moisture.

Proximate analysis:	Ultimate analysis:
Moisture	Moisture
Ash	Ash
Volatile matter	Carbon
Fixed carbon	Hydrogen
100	Oxygen
	Sulfur
	Nitrogen
	100

b/ All percents indicated by weight.

For comparison purposes in Tables B-1a through B-1ff, the nuggetizer feed (S6) was calculated as the sum of S7 + S8, ADS heavies (S4) was calculated as the sum of S6 + S5.

Besides quantifying each process stream, Tables B-1a through B-1ff also include weekly averages of the analysis results in order to characterize the streams. These averages were computed from the daily sample analysis results tabulated in Appendix B (Tables B-1a through B-1w), except for the following:

1. Chemical analysis of metals was done on a daily basis only for weeks September 23 and 30, 1974. Thereafter, this analysis was performed only on a weekly composite sample to reduce analysis cost.

2. All analyses for the weeks of November 25, 1974, through March 17, 1975, were performed on a weekly composite sample.

The ADS heavies (S4) and the various metal streams (S5, S6, S7, and S8) contained too high a metal content to make chemical analysis practical. Therefore, these samples were analyzed visually for metal content. The magnetic portion was separated into tin cans and ferrous metal. Tin cans are magnetic but contain metals other than ferrous.

The screen size distribution is reported in full. However, to make comparisons easier, the geometric mean diameter and the geometric standard deviation were calculated and reported. These two parameters are a standard method adopted by the American Society of Agriculture Engineers, Standard ASAE S319, for expressing the fineness of ground materials. This method assumes a straight line logarithmic distribution of particle size. The geometric mean diameter is the size at which half the particles are larger than, and half the particles are smaller than, the mean. The geometric standard deviation is the dispersion about the mean. A value close to one means a small dispersion, while a large value indicates that particles are widely distributed over a large size range.

An analysis of the geometric mean diameter data shows that the refuse fuel (S3) has a slightly smaller mean diameter than the mill discharge (S1). The ADS heavies (S4) contain the larger particles in the material being fed to the ADS system. Also, as would be expected, the nuggetizer feed (S6) has a larger mean diameter than the ferrous metal (S8). An analysis of the geometric standard deviation data shows that the metal streams have a smaller dispersion about the mean than the milled raw refuse or the refuse fuel.

Daily plant material flows and heating value results were used to calculate total weekly energy content of all flow streams. This method of calculating energy content of the various streams was used instead of utilizing the straight arithmetic averages of heating value in Tables B-1a through B-1ff to take into account the daily material weight variations. This was done so that the energy balance would be as accurate as possible. Table B-4a lists the weekly summary of kilojoules (Btu's) heat energy content for each flow stream, and Table B-4b presents the energy content in terms of a percent of the energy content in the hammermill discharge.

Figure 12 shows the weekly amounts of the weight of RDF and Fe metal recovered and the energy content of the RDF, all as a percent of the incoming raw refuse.

Figure 12 reflects the fact that the RDF kJ/kg (Btu/lb) heating value is higher than the raw refuse, and therefore, the RDF averages a higher percent recovery from the raw refuse on an energy basis than on a weight basis.

As Table B-4b shows, there was an energy loss which was due primarily to the weight of material loss through the system. The plant material loss is discussed more fully in the following section on material balance.

The important conclusions here are that over the total test period, the plant recovered 80.6% of the raw refuse as RDF and 4.5% of the raw refuse as ferrous metal by-product. Of the total energy in the incoming raw refuse, 83.0% was recovered as RDF. The magnetic belt rejects plus magnetic drum rejects contained only 4.0% of the energy. On an energy recovery basis, there is little value in trying to recycle the reject material to recover energy.

The nuggetizer was operating at near its maximum motor current. While it was possible to decrease the magnetic belt spacing and increase the amount of magnetic metal recovered, to do so would exceed the capacity of the nuggetizer. All recovered magnetic metal from the magnetic belt is discharged directly into the nuggetizer. Therefore, in order to determine plant ferrous metal recovery efficiency, the daily plant material flows and percent magnetic metal of each stream were used to calculate the weekly total of ferrous metal for each flow stream and thus the recovery efficiency. As was the case with heating value, this method was used instead of utilizing the straight arithmetic averages of percent magnetic metal in Tables B-1a through B-1ff to take into account variations in daily quantities.

Table B-5 records the total weekly quantities of ferrous metal and Figure 13 shows the recovery efficiency. The total recovery efficiency over the test period was only 72%. In future plants, there is room for improvement in ferrous metal recovery efficiency, either through larger sized nuggetizers or different recovery systems.

The refuse fuel stream samples were also used to determine proximate and ultimate analyses of RDF. Weekly summaries of these analyses results were computed, as shown in Table B-2, based on data from Table B-1w. Table 10 shows the

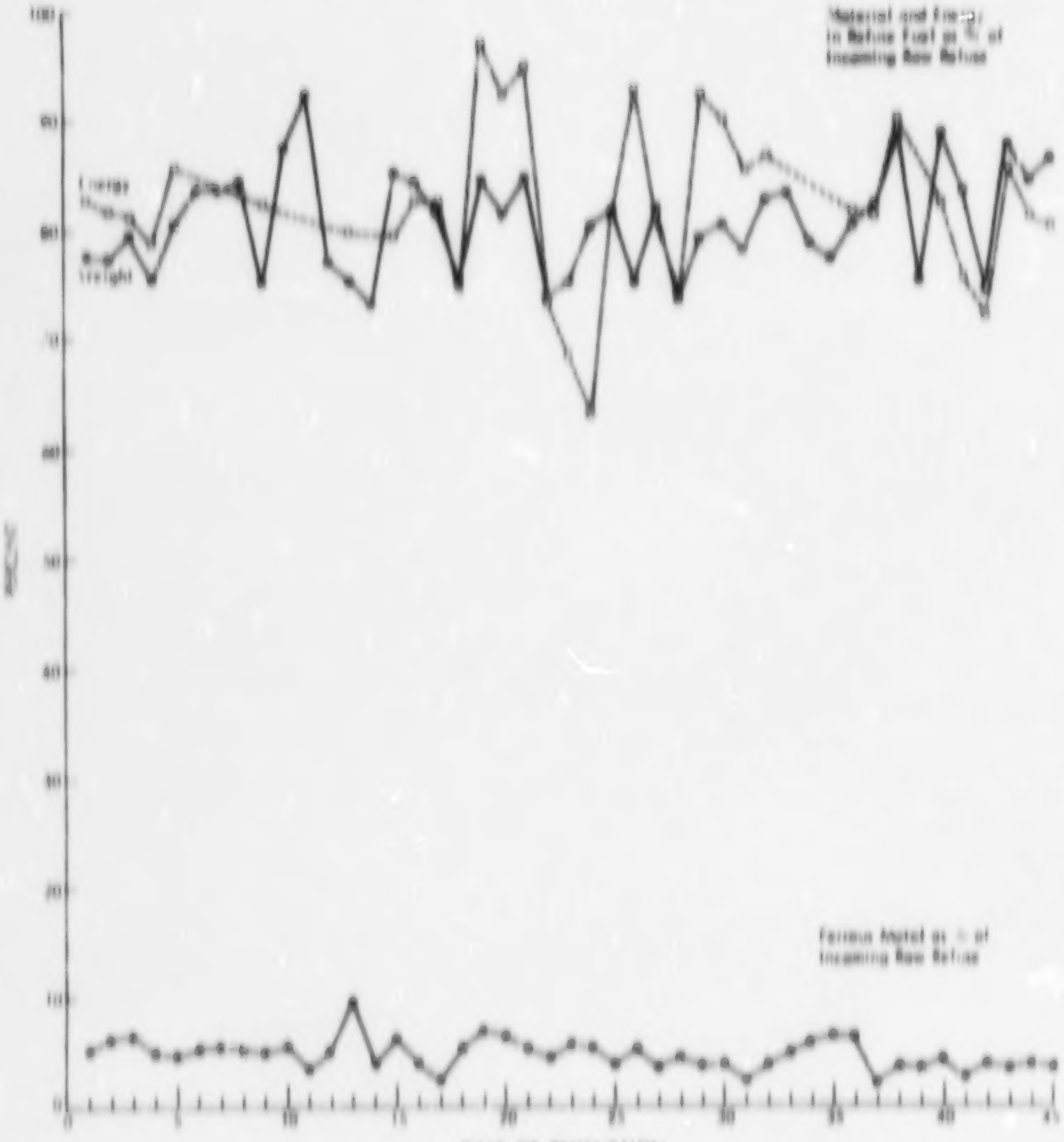

Figure 17. Weekly variations in refuse derived fuel and ferrous metal recovery

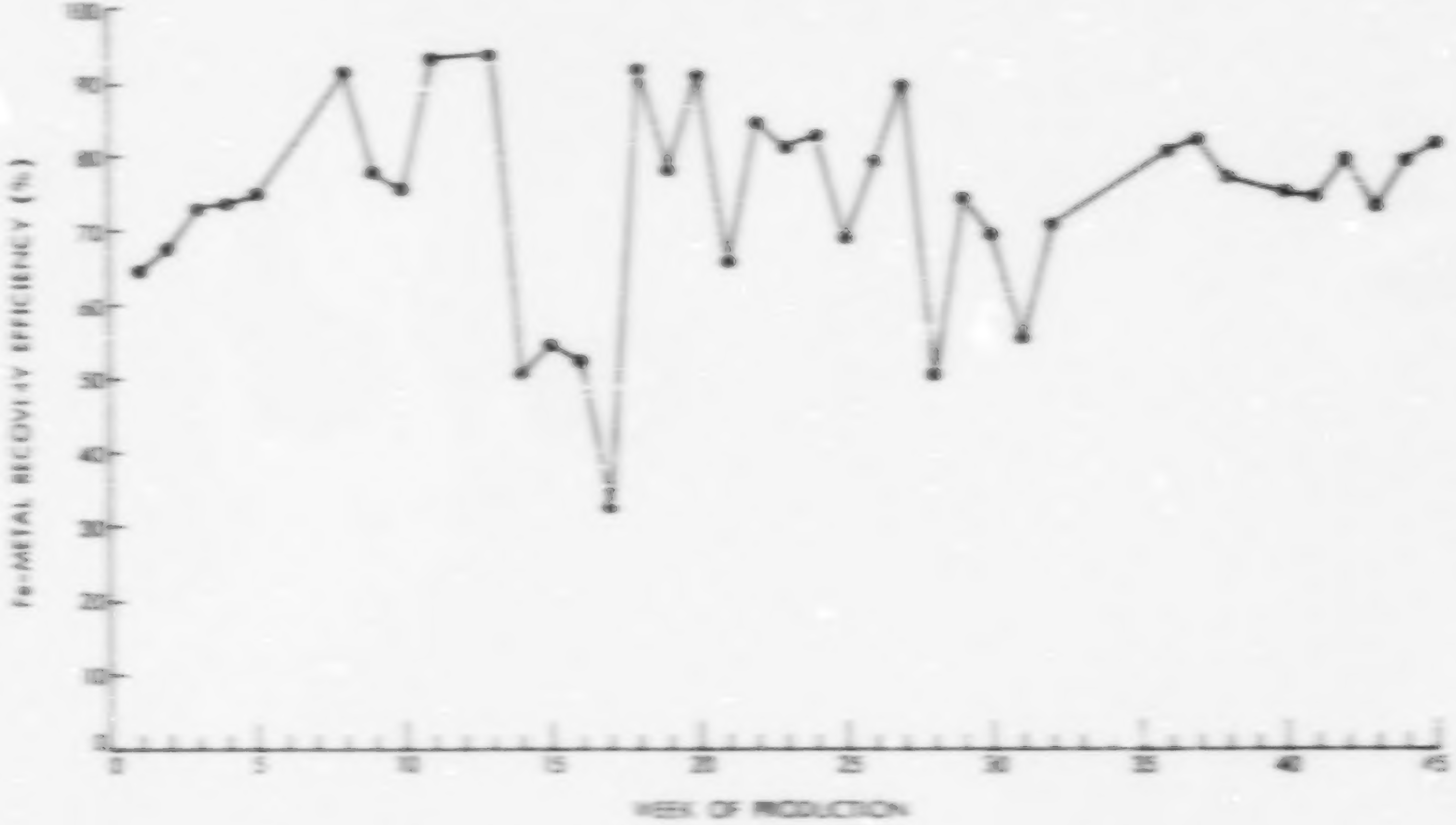

Figure 11. Weekly variations in ferrous metal recovery efficiency

average proximate and ultimate analyses characteristics for the test period and includes similar data for comparison purposes on Orient 6 coal used at the Union Electric power plant. This comparison shows that the refuse fuel is lower or higher than the coal as follows: lower--heating value, fixed carbon, carbon, hydrogen, sulfur, and nitrogen; and higher--moisture, ash, volatile matter, and oxygen.

The largest difference is sulfur. The refuse fuel contains only slightly more than one-tenth the sulfur content of Orient 6 coal during the test period shown in Table 10. The heating value of refuse fuel is 42% of the coal heating value.

Tables 9 and 10 have presented the average characteristics of the various plant flow streams over the total test period. It was observed that considerable variability occurred from day to day in some of the characteristics. Tables 11 through 18 are a tabulation for each flow stream and characteristic, the range of data (maximum and minimum values) encountered, as well as the mean or average value.

Also listed is the total number of samples in the mean and the standard deviation. The coefficient of variation was also calculated and reported in Tables 11 through 18. Coefficient of variation (C.V.) is a measure of variability because it expresses the standard deviation as a percent of the mean. As the absolute value of one characteristic increases over that of a different characteristic, the standard deviation may also increase.

A larger standard deviation does not necessarily mean larger variability, and thus C.V. is a method of accommodating this restriction. The formula for C.V. is as follows:

$$\text{C.V. } (\%) = \frac{s_x}{\bar{x}} (100)$$

where $\bar{x}$ = mean; and
s_x = standard deviation.

Finally the confidence interval above the mean at 95% confidence coefficient was calculated to show what range of values could normally be expected when taking a single day's sample.

This analysis was preformed only on the daily samples, with one exception discussed below. The weeks of testing from November 25, 1974, through March 17, 1975, were not included because samples taken during those weeks formed weekly composite samples instead of daily samples. The difference in sampling methods

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 13. VARIABILITY OF DAILY VALUES OF CHARACTERISTICS OF STREAM 13 - [illegible]

(All results based on moisture as received)

Item	Standard error ($s/\sqrt{n}$)	Range: Maximum value	Range: Minimum value	$\bar{x}$ Mean	n Number of samples	Sx Standard deviation	Variability about the mean ($\pm$) at 95% confidence coefficient	C.V. coefficient of variation (%)
Heating value (kJ/kg)	233.7	13,380	10,267	11,300	10	738.9	529	6.5
Bulk density (kg/m^3)	4.39	148	129	138.1	10	13.9	9.2	9.9
Moisture (wt. %)	1.13	33.9	22.4	27.4	10	3.59	2.6	13.1
Composition (wt. %)								
Paper	2.07	73.3	55.3	62.3	10	6.55	4.7	10.5
Plastic	1.54	18.3	1.8	6.5	10	4.89	3.5	75.1
Wood	0.46	4.3	0.3	2.3	10	1.43	1.0	62.0
Glass	0.21	1.9	0	1.0	10	0.67	0.5	67.0
Magnetic metal	0.72	2.2	0	0.1	10	2.28	0.2	380.1
Other metals	0.46	4.6	0	0.6	10	1.46	1.0	260.0
Organics	4.22	2.3	0	0.6	10	0.74	0.5	125.7
Miscellaneous	1.95	34.3	16.7	25.6	10	6.0	4.3	23.4
Chemical analysis (wt. %)								
Ash	0.31	22.05	17.47	19.2	10	1.0	0.7	5.2
Fe (Mg/g)	0.17	1.42	0.65	1.16	10	0.53	0.4	46.5
Al (Mg/g)	0.11	2.08	1.07	1.53	10	0.35	0.2	22.9
Cu (Cu)	0.013	0.15	0.01	0.05	10	0.042	0.03	84.3
Pb (Pb)	0.005	0.36	0.01	0.14	10	0.015	0.01	37.5
Ni (Ni)	0.002	0.02	0.01	0.02	10	0.007	0.005	35.0
Zn (Zn)	0.009	0.16	0.06	0.09	10	0.029	0.02	33.0
Proximate and ultimate analysis								
Volatile matter	0.42	46.41	42.72	44.5	10	1.33	0.97	2.9
Fixed carbon	1.22	12.27	0	6.85	10	3.86	2.76	55.3
Carbon	0.63	29.06	22.66	27.0	10	2.01	1.43	7.4
Hydrogen	0.11	4.26	3.22	3.75	10	0.35	0.25	9.3
Oxygen (by difference)	0.39	25.26	20.10	22.9	10	1.86	1.33	8.5
Sulfur	0.013	0.16	0.10	0.39	10	0.04	0.03	22.2
Nitrogen	0.025	0.66	0.31	0.39	10	0.33	0.24	8.6

Table [illegible]. VARIABILITY OF DAILY SAMPLES OF CHARACTERISTICS OF [illegible]
([illegible])

Item	Standard error ($s_{\bar{x}}$)	Range Maximum value	Range Minimum value	$\bar{x}$ Mean	n Number of samples	S_x Standard deviation	Variability about the mean ± at 95% confidence coefficient	C.V. coefficient of variation (%)
Heating value (kJ/kg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bulk density (kg/m^3)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Composition (wt. %)								
Paper	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] (wt. %)								
Fe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tin cans	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Al	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cu	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Particle size								
Geometric mean diameter (mm)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Item	Standard value	Range: Maximum value	Range: Minimum value	X̄ Mean	n Number of samples	Sx Standard deviation	Variability about the mean at 95% confidence coefficient	C.V. coefficient of variation (%)
Heating value (kJ/kg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Composition (wt. %)								
Paper	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] (wt. %)								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Particle size								
Geometric mean diameter (cm)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Item	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]							
[illegible]								
Paper	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
Fe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tin cans	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Al	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cu	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Table 17. VARIABILITY OF DAILY VALUES OF CHARACTERISTICS OF STREAM 17 - MAGNETIC DRUM REJECTS
(All results based on moisture as received)

Item	Standard error (s/√n)	Range: Maximum value	Range: Minimum value	x̄ Mean	a/ Number of samples	1σ Standard deviation	Variability about the mean (%) at 95% confidence coefficient	C.V. coefficient of variation (%)
Heating value (kJ/kg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Composition (wt. %)								
Paper	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Plastics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Metal analysis (wt. %)								
Fe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tin cans	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Al	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cu	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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a/ [illegible] not operating for [illegible] days and samples not collected for [illegible] days ([illegible]).

[illegible]

Item	Standard error	Range: Maximum value	Range: Minimum value	$\bar{X}$	Number of samples[a]	1σ Standard deviation	Variability about the mean (±) at 95% confidence coefficient	C.V. coefficient of variation (%)
Heating value (kJ/kg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Composition (wt. %)								
Paper	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Particle size								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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[a] [illegible]

Between daily and weekly composite samples could possibly contribute to variability; therefore, results from the two methods should not be combined in a variability analysis.

The one exception is the chemical analysis of metals in F1 and S2. Even during weeks of daily sampling, this analysis was conducted on only a weekly composite basis, except for the first 2 weeks of sampling. Therefore, the weekly composite sample results of metals by chemical analysis were analysed for variability, yielding 35 samples instead of 97 for the other characteristics.

The mean values shown in Tables 11 through 18 differ slightly from the average characteristic values shown in Tables 9 and 10. Tables 9 and 10 are the average of all weeks, including the 13 weeks of weekly composite data. However, an analysis of the weekly composite values revealed that they fell within the range of maximum and minimum values found for the daily samples.

An analysis of Tables 11 through 18 show that the variability expressed as C.V. often becomes quite high when the mean values are very low, such as compositional items other than metal in S6 (Fe metal by-product).

For all streams, the categories of heating value, moisture, ash, bulk density, particle size, and proximate and ultimate analyses generally had lower variability than the categories of composition and metal analysis. This leads to the conclusion that comparisons between heating values and moisture and ash could yield reliable results because of the lower variability of these characteristics.

RDF VARIABILITY

Table 12 shows the variability of RDF (S2) heating value on a moisture as received basis. Data on moisture, ash, and heating value of RDF were statistically analysed, showing an expected, but important, relationship of increasing heating value with decreasing moisture and ash content. Therefore, heating value of RDF was calculated on both a moisture free and a moisture and ash free basis.

The statistical standard deviation S_x and the coefficient of variation C.V. (standard deviation as a percent of the mean) were calculated for the daily sample data to determine if variability of RDF heating value changes when expressed on a moisture free or moisture and ash free basis.

Table B-6 shows the results of these calculations which are summarized below:

Characteristic	$\bar{X}$	C.V. (%)
Moisture (wt. %)	26.55	27.60
Ash as received (wt. %)	21.71	21.23
Ash moisture free (wt. %)	29.56	18.10
Heating value as received (kJ/kg)	10,636	12.88
Heating value moisture free (kJ/kg)	14,496	9.98
Heating value moisture and ash free (kJ/kg)	20,570	6.15

Variability as expressed by C.V. is highest for moisture and lowest for heating value. The heating value C.V. on a moisture free basis is approximately three-fourths of that for the moisture as received basis. Heating value C.V. on a moisture and ash free basis is slightly less than one-half of that for the moisture as received basis.

Therefore, the heating value of the combustible fraction of RDF is higher and a less variable value than what would be predicted from the moisture as received heating value.

Statistical analysis of the data showed 67% correlation between heating value and moisture and 77% correlation between heating value and ash. The plot of the data and the best fit curve equations are shown in Figure 16.

EVALUATION OF DATA ON DOUBLE GRIND TESTS

Tests were conducted during the week of February 17, 1975, to define the characteristics of double grind refuse. The procedure used in the tests was to collect the ADS light and heavy fractions produced on February 18, and truck them back to the raw refuse receiving floor for regrinding on February 19. Samples of the main process streams were collected by the usual procedures during the regrind tests, and the collected samples were then subjected to the usual analysis.

Characteristics of the double grind refuse are shown in Table 19. Table 20 shows the proximate and ultimate analyses of double grind refuse derived fuel (RDF) compared to the average of single grind RDF.

Double grind RDF produced in the test amounted to 76.8% by weight of the incoming raw refuse. The ferrous metal recovery efficiency was 75.8%. Neither of these values represents a significant improvement over single grind conditions, as they fall within the range of values for single grind RDF. However, there may have been some material loss due to spillage because of the procedures involved in returning the single grind material to the receiving floor. The material weight loss error for the double grind material balance was 14.9% which is higher than the total test period material loss of 7.6%.

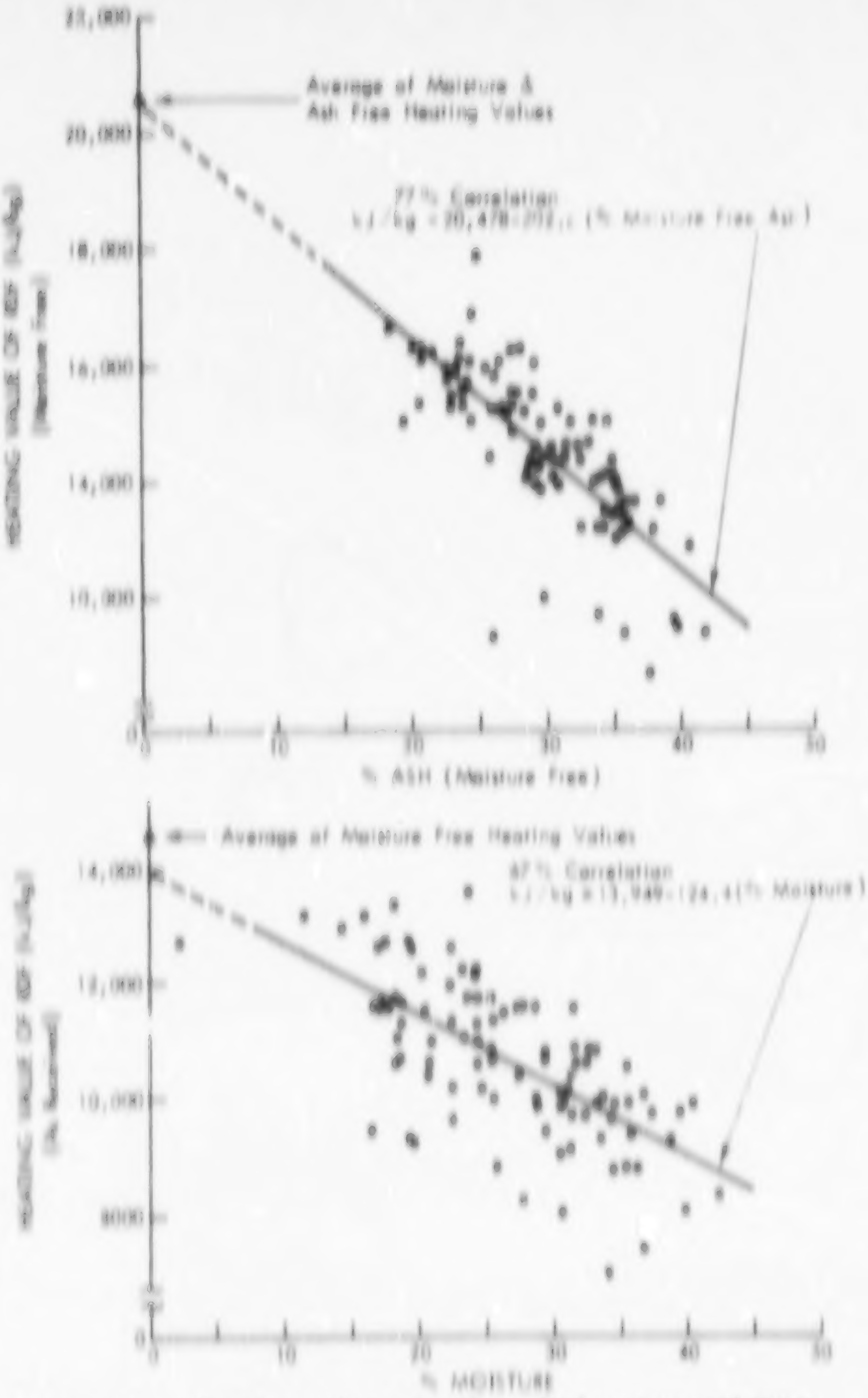

Figure 16, Heating value of refuse fuel versus moisture content for daily samples

Table 19. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS
FOR [illegible] FEBRUARY 19, 1975
([illegible] ground [illegible])

	[illegible]	[illegible]	Magnetic [illegible]	Magnetic [illegible]	Ferrous metal
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 20. PROXIMATE AND ULTIMATE ANALYSIS OF DOUBLE-GRIND RDF
(Stream 62 - cyclone discharge)

Received moisture basis	Double-grind RDF (February 19, 1975)	Average single-grind RDF (September 23, 1974, through September 3, 1975)
Heating value (kJ/kg)	14,132	11,117
Moisture (wt. %)	24.90	25.25
Ash (wt. %)	17.95	20.85
Volatile matter (wt. %)	48.44	44.75
Fixed carbon (wt. %)	8.71	9.15
Carbon (wt. %)	29.82	27.06
Hydrogen (wt. %)	4.51	4.03
Oxygen (wt. % by difference)	22.21	22.12
Sulfur (wt. %)	0.17	0.18
Nitrogen (wt. %)	0.44	0.51

Energy content of the double grind RDF was 88.6% of the energy content of the incoming raw refuse. This value compares favorably with the total test period average value of 81.0% for single grind RDF.

The high energy recovery for double grind RDF is a result of the high heating value of 14,132 kJ/kg (6,075.7 Btu/lb) at 24.9% moisture. This heating value is higher than would be predicted from the data previously obtained for single grind RDF. The data for single grind RDF summarized in Figure 14 indicate that a heating value of 10,851 kJ/kg (5,065 Btu/lb) would be expected for single grind RDF at a moisture content of 24.9%. The highest heating value for a single grind RDF near this moisture level was 13,614 kJ/kg (5,853 Btu/lb) at 23.9% moisture.

The oxygen and volatile matter content of the double grind RDF was higher than the average for single grind RDF but not outside the maximum and minimum values for single grind RDF.

The high heating value 14,132 kJ/kg (6,075.7 Btu/lb) for the double grind RDF appears to be due to the higher percentage of paper in the fuel. Double grind RDF contained 77.7% paper compared to the highest daily value of 71.8% paper for single grind RDF. The percent paper in the hammermill discharge (S1) was relatively high (67.3%), but higher values were previously found on 3 days for single grind material. Therefore, the high percent paper in the double grind RDF is not fully attributable to a correspondingly high percent paper in S1.

Mean particle size of double grind RDF was not significantly different from the average for single grind RDF. Geometric mean diameters are 8.4 mm versus 8.6 mm (0.33 in. versus 0.34 in.). However, the geometric standard deviation of 2.56 for double grind RDF was less than the lowest daily value of 2.62 for single grind RDF. Thus, there is a smaller particle size dispersion about the mean for double grind RDF.

The particle size geometric mean diameter of 6.1 mm (0.24 in.) of the hammermill discharge for the double grind material was only slightly smaller than the daily value of 6.4 mm (0.25 in.) for single grind material. The dispersion about the mean for double grind material fell within the range found for single grind material.

The particle size and dispersion of the double grind magnetic belt rejects and ferrous metal by-products was within the range for single grind material.

Processing rate for the double grind material was 30.6 Mg/hr (33.7 tons/hr) which is within the range found for single grind.

In summary, there is a trend of improved RDF quality due to double grinding. However, this conclusion was made with only 1 day's test data and further testing is needed to verify this trend. Logistics of material handling at the St. Louis facility make it very difficult to conduct a double grind test, and therefore, additional tests were not conducted.

EVALUATION OF DATA ON FINE GRIND TESTS

A series of tests to determine the characteristics of fine grind RDF was conducted during the period of April 18 to 23, 1975. In order to conduct these tests, the normal grates with 76-mm (3-in.) square openings were replaced with grates having 32-mm (1-1/4 in.) diameter openings. Samples of the main process streams were collected by the usual procedures, and the collected samples were then subjected to the usual analysis.

Table 21 shows the average characteristics of the fine grind refuse for the 5-day test period. Table 22 presents a comparison of the proximate and ultimate analyses of fine and the regular grind RDF, while Table 23 shows sample variability of milled refuse.

Fine grind RDF represented 73.8% by weight of the incoming raw refuse. On the basis of weighted average values, fine grind RDF energy recovery was 74.5% and ferrous metal recovery was 64.3%.

Ferrous metal recovery is within the range of values found for regular grind material. However, the weight recovery of RDF at 73.8% is slightly lower than the lowest value of 76.0% for regular grind material.

One contribution to the decreased material recovery is the increase in air emissions from the ADS cyclone which are discussed in detail in a later section of this report. A marked increase in kilograms per hour (pounds per hour) emissions from the ADS systems occurred for fine grind material as compared to emissions from normal grind material. Emissions from the ADS increased from an average of 22 kg/hr (50 lb/hr) for normal grind to 57 kg/hr (125 lb/hr) for fine grind. This increase is significant considering that the normal grind processing rate of 36 Mg/hr (40 tons/hr) was reduced to 23 Mg/hr (25 tons/hr) during fine grind, which means that the emission factor increased from 0.95 kg/Mg (1.90 lb/ton) for normal grind to 2.73 kg/Mg (5.46 lb/ton) for fine grind. It should be noted, however, that the reduced processing rate for fine grind also necessitated reduced air flow in the ADS system, which may have impaired removal efficiency in the ADS cyclone.

Hammermill dust collection system particulate emissions in terms of kilograms per megagram (lb/ton) are quite small compared to the ADS emissions, and therefore, would not contribute significantly to decreased material recovery.

Table 11. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR FINE GRIND TEST
(Week of April 18-22, 1979; 32 mm diameter hammermill grate openings)

	21 Mill discharge	22 Cyclone discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal by-products
Quantity (Mg)	887.2	811.6	61.6	2.5	38.7
Heating value (kJ/kg)	9,4[illegible]	9,031	4,181	8,358	8,359
Bulk density (kg/m³)	167	133	706	1,276	1,386
Moisture (wt. %)	26.60	23.08	7.17	1.08	3.10
Composition (wt. %) (as-received)					
Paper	51.1	58.2	0.5	0	0
Plastic	8.7	3.8	1.5	13	0
Wood	3.0	2.9	5.8	0.1	0
Glass	3.2	1.8	33.2	0.1	0
Magnetic metal	7.1	0	51.1	98.1	99.9
Other metals	0.6	0.1	8.7	1.3	[illegible]
Organics	4.3	3.5	7.8	13	0
Miscellaneous	23.6	29.8	26.5	0.5	0.1
Chemical analysis (wt. %)					
Ash	25.71	26.13			
Fe (Fe_2O_3)[a]	5.83	7.58			
Al (Al_2O_3)[a]	1.73	1.83			
Cu (CuO)[a]	0.01	0.03			
Pb (PbO)[a]	0.03	0.05			
Ni (NiO)[a]	0.01	0.01			
Zn (ZnO)[a]	0.07	0.07			
Visual analysis (wt. %)					
Fe			5.67	18.80	16.38
Tin cans			33.57	79.73	83.33
Al			3.10	1.01	0.11
Cu			0.84	0.01	0.01
Size (mm)					
Percent larger than 51.1	0.0	0.0	0.0		0.0
Percent less than 51.1	100.0	100.0	100.0		100.0
Percent less than 38.1	99.3	100.0	100.0		100.0
Percent less than 19.1	93.3	97.9	91.7		93.1
Percent less than 7.1	65.3	75.0	50.4		39.6
Percent less than 4.8	51.8	51.1	16.6		3.7
Percent less than 2.5	37.7	36.1	6.0		0.3
Particle size					
Geometric mean diameter (mm)	5.3	5.0	8.6		15.1
Geometric standard deviation	3.33	3.32	1.96		1.51

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[a] Data taken from weekly composite.

Table 22. PROXIMATE AND ULTIMATE ANALYSIS OF FINE-GRIND RDF (Stream 52 - cyclone discharge)

Received moisture basis	3-Day average fine grind[a] (April 18-23, 1975)	Average regular grind[b] (September 23, 1974, through September 5, 1975)
Heating value (kJ/kg)	9,631	11,117
Moisture (wt. %)	25.08	25.25
Ash (wt. %)	26.15	20.85
Volatile matter (wt. %)	41.27	44.75
Fixed carbon (wt. %)	7.50	9.15
Carbon (wt. %)	23.92	27.06
Hydrogen (wt. %)	3.56	4.03
Oxygen (wt. % by difference)	20.52	22.12
Sulfur (wt. %)	0.23	0.18
Nitrogen (wt. %)	0.56	0.51

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[a] 32 mm diameter grates in hammermill.
[b] 76 mm square grates in hammermill.

Table 33. SAMPLE VARIABILITY OF MILLED REFUSE

Spectrum	Variability about the mean (±)[a] (at 95% confidence coefficient and sample size = 6)
Moisture (wt. %)	3.89
Heating value (kJ/kg)	1,111
Ash (wt. %)	3.66
Bulk density (kg/m³)	17.30
Metal content by chemical analysis (wt. %)	
Fe (Fe_2O_3)	0.68
Al (Al_2O_3)	0.55
Cu (CuO)	0.037
Pb (PbO)	0.060
Ni (NiO)	0.0091
Zn (ZnO)	0.037
Proximate and ultimate analysis (wt. %)	
Volatile matter	3.12
Fixed carbon	4.33
Carbon	1.99
Hydrogen	0.36
Oxygen (by difference)	2.39
Sulfur	0.083
Nitrogen	0.072
Composition by visual analysis (wt. %)	
Paper	9.6
Plastic	6.73
Wood	3.75
Glass	0.90
Magnetic metal	[b]
Other metals	[b]
Organics	[b]
Miscellaneous (tr = trace)	10.09
Square screen size (mm) (wt. %)	
Larger than 63.5 mm	No variance
Less than 63.5 mm	No variance
Less than 38.1 mm	8.25
Less than 19.1 mm	12.06
Less than 9.5 mm	10.66
Less than 4.7 mm	9.08
Less than 2.4 mm	6.00

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[a] Variability based on sample data reported in Appendix B (Table B-8).

[b] Variance not calculated because of large number of trace or zero responses.

In addition to accounting for a portion of the decreased material recovery, the increases in air emissions from the ADS and HM systems indicate a more difficult materials handling problem with fine grind RDF (e.g., windborne losses are likely to increase, etc.).

Heating value of the fine grind RDF was low, being only 9,630 kJ/kg (4,140 Btu/lb) at 25.0% moisture. As shown in Figure 14, a heating value of 11,828 kJ/kg (5,085 Btu/lb) would be expected for regular grind RDF at this moisture content. This low RDF heating value was due to the low heating value of the incoming raw refuse. Heating value of 31 (mill discharge) for fine grind tests was 9,476 kJ/kg (4,074 Btu/lb) at 24.6% moisture compared to the lowest weekly average for regular grind of 10,697 kJ/kg (4,599 Btu/lb) at 28% moisture. The reason for the lower heating value of 31 is not apparent from the compositional analysis.

The majority of regular grind refuse streams will pass a 38.1-mm (1.5-in.) square screen while the majority of fine grind refuse streams will pass a 19.1-mm (0.75-in.) square screen (see Table 21). For the first four daily samples, 100% of the sample from 31 passed a 38.1-mm (1.5-in.) screen. On the fifth day, the hammermill screen was torn badly enough that only 99.1% of the 31 sample passed a 38.1-mm (1.5-in.) screen. Therefore, for the 5-day average, 99.8% of the fine grind material passed a 38.1-mm (1.5-in.) screen.

The following comparison shows that the reduction in mean particle size was approximately equivalent for all streams except the ferrous metal (38), which had a larger size reduction.

	Geometric mean diameter-mm			
	31	32	33	38
Regular grind (Table 9)	8.9	8.9	14.2	16.5
Fine grind (Table 21)	5.3	4.6	8.6	10.4
Change (decrease in size)	3.6	4.3	5.6	6.1

The nuggetizer produced a much smaller size of ferrous metal by-product during fine grind because it has a smaller input particle size material to handle.

The dispersion about the mean (geometric standard deviation) was smaller for fine grind except for the ferrous metal by-product which exhibited no change.

Using the fine grind grates reduced the hammermill capacity to an average of 22.6 Mg/hr (25 tons/hr), with a range of 20.8 to 27.2 Mg/hr (23 to 30 tons/hr). Regular grind processing rate during the period September 23, 1974, through September 5, 1975, averaged 31.0 Mg/hr (34.2 tons/hr).

After each day's operation, the hammermill was opened and the fine grind grate inspected. By the end of the second day, structural failure of the grate had commenced. The grate was torn in several places and these tears became larger and more numerous with each successive day's operation. Several irregular splits approximately 152 mm (6 in.) long had occurred in the grate. Continued operation would have caused these to open up, allowing large refuse particles to pass into the system which may have clogged the materials handling equipment.

In summary, the processing plant is capable of processing refuse using 32-mm (1-1/4 in.) diameter opening hammermill grates with a 28% reduction in average processing rate as compared to the normally used grates with 76-mm (3-in.) square openings. However, because grate life was only 869 Mg (958 tons), fine grinding of raw refuse does not appear attractive. Also, associated testing of fine grind refuse at the power plant did not indicate any significant increase in combustion efficiency.

PLANT MATERIAL BALANCE

The total material balance for the entire 1-year test period of September 23, 1974, through September 30, 1975, is shown in appendix B (Tables B-7a and B-7b). Table B-7a shows the actual weights of the material balance while Table B-7b shows the material balance in percent form.

During this 1-year period of 53 weeks, plant production occurred during 45 weeks with 8 weeks during which the plant did not operate. Following is a summary of the yearly total:

PLANT MATERIAL BALANCE--TOTAL FOR THE YEAR

	Stream	Mg	%
Plant input			
Raw refuse received	31	28,052.6	100
Plant output			
RDF	32	22,610.9	80.60
Fe metal by-product	38	1,268.2	4.52
Magnetic belt rejects	35	2,019.8	7.20
Magnetic drum rejects	37	29.7	0.11
Total		25,928.5	92.43
Material balance weight loss		2,124.1	7.57

The data in Tables B-7a and B-7b and the summary show that there was always a material loss. That is, the amount of plant output (32, 35, 37, and 38) never equaled the amount of incoming raw refuse (31). There are five possible sources of this loss.

1. Particulate and moisture loss from the hammermill dust collection system.

2. Particulate and moisture loss from the ADS system air flow.

3. Spillage from equipment.

4. Possible scale errors in weighing magnetic drum rejects (37).

5. Possible scale errors in weighing trucks.

Emission test data have shown that the maximum particulates and moisture losses from the hammermill and ADS system could account for about 1.5% of the losses. Unfortunately, no method was available to accurately measure equipment spillage. However, this spillage is estimated to be considerably less than 1% basis visual observations, and therefore, would not account for much of the overall material loss.

Magnetic drum rejects were weighed each day by MRI field personnel. The rejects were collected in a small enclosure underneath the magnetic drum. At the end of each day, this material was manually scooped into a 0.02 m^3 (0.7 ft^3) container and weighed using a portable spring scale. The accuracy of this scale was verified by weight comparisons to the large dial scale located in the field trailer and used to make bulk density measurements. Also, magnetic drum rejects account for only 0.11% of the total plant input, so that even if scale errors existed, they would not have a major effect on the total plant material balance.

Because the above four items of particulate loss, moisture loss, spillage, and magnetic drum reject scale error could not account for all of the plant material loss, scale operations in weighing trucks were investigated as a possible cause of the material imbalances.

The scale at the refuse processing plant is not used for buying or selling, and therefore is not a certified scale. That is, it is not a scale whose accuracy is periodically checked and certified as being correct by the City of St. Louis, Division of Weights and Measures, the governmental agency responsible for licensing weighing devices used in commercial transactions in the St. Louis area.

Therefore, a test was conducted whereby refuse processing plant trucks, selected at random, were weighed both on the refuse processing plant scale and official scales, inspected and licensed by the St. Louis Division of Weights and Measures. The number of trucks involved in this study and the scale error is as follows:

Truck category	No. of trucks	Official scale	Average processing plant scale error (%)
Raw refuse	10	Industrial Sugar	0.92 heavy
Fe metal and magnetic belt rejects	1	Industrial Sugar	3.67 light
RDF	2	Union Electric	1.56 heavy

The Industrial Sugar Company scale is located at 3600 South First Street, only 5 blocks away from the refuse processing plant at 4100 South First Street. The Union Electric scale used was the truck scale at the Union Electric Meramec plant.

The result of this test is that the plant weight records show more raw refuse received and less Fe metal and magnetic belt rejects shipped than is actually true. These two scale errors account for a material loss in the plant weight records. However, this is offset by the fact that the plant weight records show more

RDF shipped than was actually true, making up in part for the material loss due to scale error in weighing the raw refuse and Fe metal and rejects trucks.

Also, these scale errors cannot be summed directly because they do not all apply to the same tonnages. Table B-7b shows the total recorded tonnage for the year. Applying these known scale errors and the 1.5% moisture and particulate loss results in a net 6% material loss as shown in Figure 15.

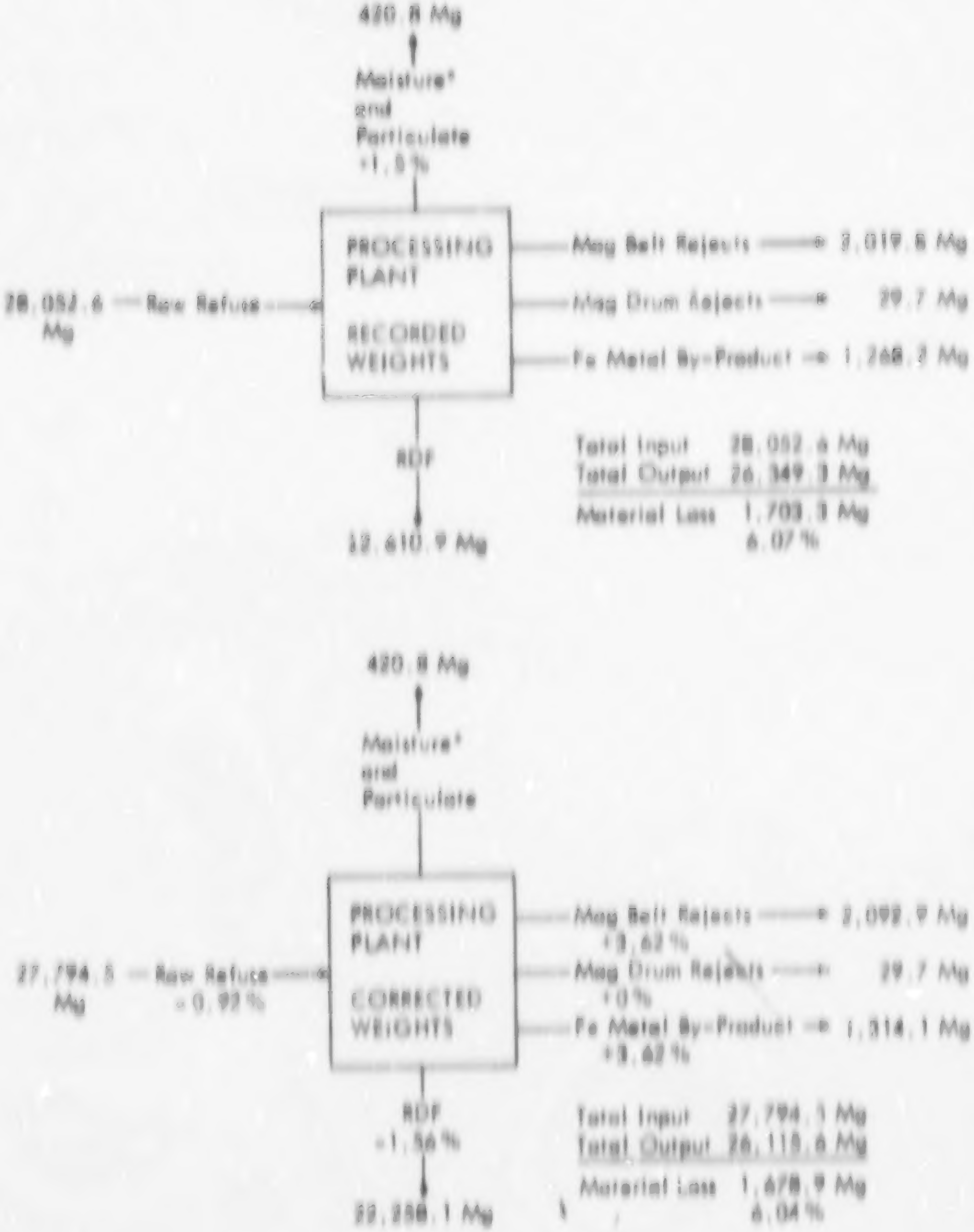
This test shows that the individual categories of truck errors partially cancel one another and do not yield any scale error significant to the total material balance weight loss.

The RDF produced was calculated by taking the storage bin shipments for the week and applying the storage bin differential between the start and end of the week. The amount of RDF in the storage bin was estimated from visual observations. Thus, it is possible that a material balance error could result from errors in calculating the storage bin differential. An analysis of the storage bin shipments was made by totaling the storage bin shipments over the year's test period taking into account that the storage bin was empty at the end of the test period and contained an estimated 11.8 Mg (13 tons) at the beginning of the test period. The total storage bin discharge agreed within 1% of the calculated total RDF produced. Therefore, while storage bin inventory differential could possibly produce a material balance error during an individual week, the storage bin inventory differentials cancel out over the total test period and the 6% unaccounted material loss cannot be explained from the method used to calculate RDF produced.

The RDF trucks were all weighed. When RDF trucks are loaded at the packer station, a log sheet is prepared showing the trucks loaded per day. Also, at the power plant receiving building, a similar log sheet is prepared, showing the trucks unloaded per day. These two log sheets and the scale records all agreed. Therefore, to have an RDF truck not weighed, all three records (load, scale and unload log) would have to be in error, and this is highly unlikely.

Three possibilities exist which could explain part of the remaining material balance error.

1. Unweighed raw refuse trucks: When incoming raw refuse trucks enter the plant, they first pass over the city scale. After weighing, the truck driver is then told to proceed either to the incinerator or the refuse processing plant and his truck weight recorded accordingly by the scale operator on a log sheet. While it was never observed to have happened, it is possible that the raw refuse truck driver could have made a mistake and discharged his truckload at the incinerator when he was intended to discharge at the processing plant.


420.8 Mg
Moisture*
and
Particulate
+1.5%
PROCESSING
PLANT
RECORDED
WEIGHTS
28,052.6 Mg
Raw Refuse
Mag Belt Rejects
2,019.6 Mg
Mag Drum Rejects
29.7 Mg
Fe Metal By-Product
1,268.2 Mg
RDF
22,610.9 Mg
Total Input 28,052.6 Mg
Total Output 26,349.3 Mg
Material Loss 1,703.3 Mg
6.07%
420.8 Mg
Moisture*
and
Particulate
PROCESSING
PLANT
CORRECTED
WEIGHTS
27,794.5 Mg
Raw Refuse
-0.92%
Mag Belt Rejects
+3.62%
2,092.7 Mg
Mag Drum Rejects
+0%
29.7 Mg
Fe Metal By-Product
+3.62%
1,314.1 Mg
RDF
-1.56%
22,258.1 Mg
Total Input 27,794.5 Mg
Total Output 26,115.6 Mg
Material Loss 1,678.9 Mg
6.04%

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* Moisture and particulate loss estimated from environmental tests.

Figure 15. Corrected plant input-output weights

2. Unweighed Fe metal and rejects trucks: When the magnetic belt reject and Fe metal trucks are full, they are weighed on the city scale before they discharge their loads on the city property. While it was never observed to have happened, it is possible that a plant workman could have mistakenly discharged a truckload of material either at the Fe metal stockpile or the city landfill without weighing his truck.

3. Hammermill: The weight of the raw refuse received is the weight of material before it enters the hammermill. Samples were taken after the material left the hammermill (S1). Therefore, comparison of samples before and after the hammermill was not possible. There could have been moisture and other volatile material loss during the shredding operation in the hammermill. It is known that there was moisture loss through the hammermill dust collection system and this has been accounted for. However, there could have been additional loss through the inlet throat and discharge opening of the hammermill. It was observed that outward flowing air currents or blowback from the hammermill inlet throat did occur. There was no way to measure this air flow, but it conceivably could carry away moisture and other vapors from the refuse as it is being shredded.

Between 1966 and 1972, studies of shredding municipal refuse were conducted at Madison, Wisconsin.[2] The process involved in this study was shredding only; no air separation, metal recovery, or other process operations were involved. Recent conversations with personnel in the Engineering Division, City of Madison, revealed that they had experienced material loss ranging from 2 to 5%. Since only a shredder was involved, this loss is entirely the loss attributable to the shredder. Like the St. Louis project, they could not account for this loss through documentation. They theorize that the loss is due to moisture loss, spillage, and trucks sometimes not being weighed.

In 1970, Sanders[3] reported results of the Bureau of Solid Waste's experiments shredding municipal refuse. In one set of experiments, measured moisture loss across the shredder ranged from an average 4 to 7%. In a second experiment, actual measured weight loss across the shredder was 3.96%.

While the St. Louis project unaccounted error of 6.04% is slightly higher than the Madison project error range of 2 to 5%, it is within the 4 to 7% moisture loss range and practically identical to the 3.96% weight loss reported in the Bureau of Solid Waste study. While it has not been possible to document the precise reason for the St. Louis weight loss, it is important to note that others have had the same experience.

The St. Louis plant was not constructed to allow material weight checks directly across the hammermill or any of the other pieces of processing equipment. In any future projects, the initial plant design should consider need for or use of weighing equipment. Such items as optional by-pass chutes and/or conveyors and space allowed for installation of automatic in-plant bulk weighing scales should be considered. Availability of such equipment would permit detailed weight checks across individual items of equipment.

EVALUATION OF ENVIRONMENTAL IMPACTS

Studies conducted at the processing plant to evaluate environmental impacts were directed to quantifying emissions and evaluating other environmental aspects of the facility and its operations. The objectives of the tests follow:

1. Determine mass emission rates and particle size for particulate matter discharged from the Air Density Separator (ADS) and from the hammermill (HM) cyclone for both regular grind and fine grind refuse.

2. Conduct analysis of particulate matter emissions in an effort to identify potential hazards that may exist due to bacteria and virus.

3. Quantify water effluents and pollutant levels therein.

4. Make preliminary assessment of the leachability of all solid waste effluents that do or can occur from this facility.

5. Carry out a noise survey in and around the processing plant for comparison with existing O.S.H.A. standards.

Results of the environmental test activities are presented and discussed in the following subsections of this report. In some cases, details of test procedures and tabulations of data are contained in the appendices as noted.

AIR EMISSIONS: PARTICULATE AIR EMISSIONS FROM AIR DENSITY SEPARATOR AND HAMMERMILL CYCLONES

Tests were performed to determine conventional particulate emissions as well as bacteria and virus levels in the exhaust streams from the ADS and HM systems. Results of the tests are discussed next.

Conventional Particulate Emissions

Primary sources of air emissions are the discharges from the Air Density Separator (ADS) cyclone and the hammermill dust collection system (HM) cyclone.

Both of these sources were tested on three separate periods, twice during periods when regular grind RDF was being produced, and one other period during which fine grind RDF was being produced for Union Electric via substitution of 32-mm (1-1/4 in.) diameter round hole grates in the hammermill rather than the normal 76 by 76-mm (3 by 3 in.) opening grates.

Analysis of the processing plant refuse streams during the test periods is included in the data tabulated in preceding sections of this report. A description of the air emission test procedures and tabulations of the test data are presented in Appendix C.

A summary of the mass emissions from the ADS and HM for all three test periods is shown in Table 24. The particle size distribution tests that were carried out during two of these periods are presented in Figures 16 and 17.

ADS Emissions—

Mass emissions from the ADS cyclone for the eight regular grind tests ranged from 9.0 to 35.3 kg/hr (19.9 to 78.0 lb/hr) with an average of 27.2 kg/hr (60 lb/hr) with corresponding emission rates from 0.28 to 1.99 kg/Mg (0.56 to 3.97 lb/ton) with an average of 0.95 kg/Mg (1.89 lb/ton). This emission rate indicates the need for controlling or reducing the emissions in future plants of this type.

Particle size tests on the ADS cyclone discharge during regular grind operations (Figure 16) showed that at least 80% of the particulate emissions were larger than 10 μm. Based on visual observations, it was suspected that a considerable number of the emissions were probably much larger than 10 μm.

It was thought worthwhile to try to quantify the emission of these particles for comparison with the overall average emission rate of 27.2 kg/hr. Therefore, a net arrangement was constructed of nylon mesh with openings of 6.4 by 6.4 mm (1/4 by 1/4 in.). During 4 days in December 1974 and January 1975, this net was placed over the outlet of the ADS fan for approximately 1/2 hr each day in an attempt to capture and weigh all of the larger particles. These tests (Table 25) showed that the emission rate of large particles greater than 6.4 mm (1/4 in.) ranged from 2.0 to 3.6 kg/hr (4.4 to 8.0 lb/hr) with an average of 2.5 kg/hr (5.6 lb/hr). The composition of this effluent was also scrutinized. Much of it was found to be pieces of paper and plastic, as well as miscellaneous fibrous materials. Most importantly, the heating value of these emissions was 17,617 kJ/kg (7,574 Btu/lb) higher than the RDF produced on the same day.

Because the emission of the larger particles was a nuisance problem in the near plant vicinity, the ADS discharge ducting was changed to direct the discharge into a settling chamber area underneath the RDF storage bin. This settling chamber was an area approximately 11.6 by 5.2 m (38 by 17 ft) and 3.0 m (10 ft) in height which was enclosed with 1.6 mm (1/16 in.) square opening nylon mesh. No tests were conducted to determine efficiency of particulate removal of this arrangement, but it did remove most of the larger particles and abated the associated nuisance problems. However, more effective control methods such as use of fabric filters is recommended in future plants.

[illegible]

	[illegible]					[illegible]			[illegible]		
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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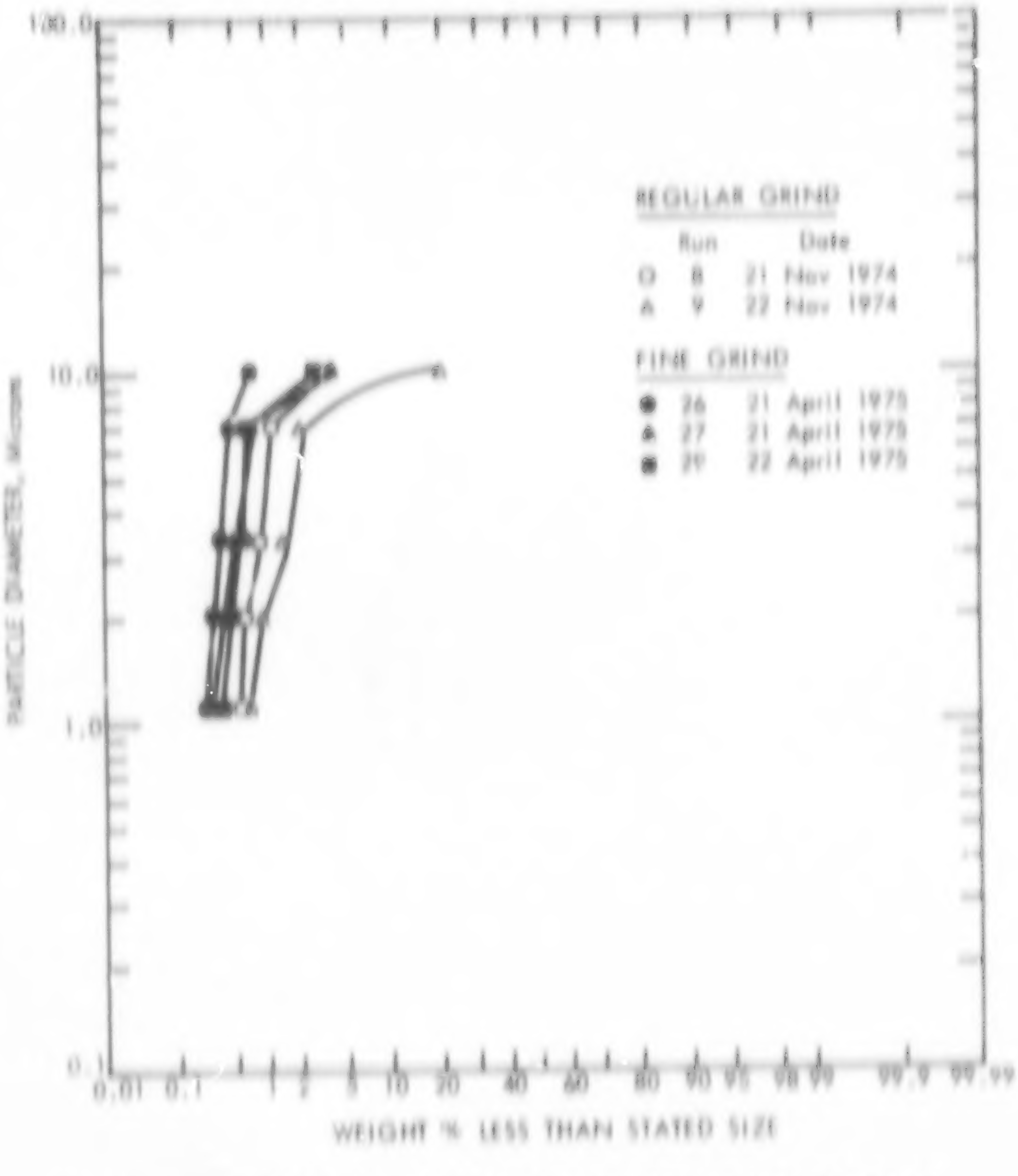

Figure 16. Particle size distribution for ADS cyclone discharge

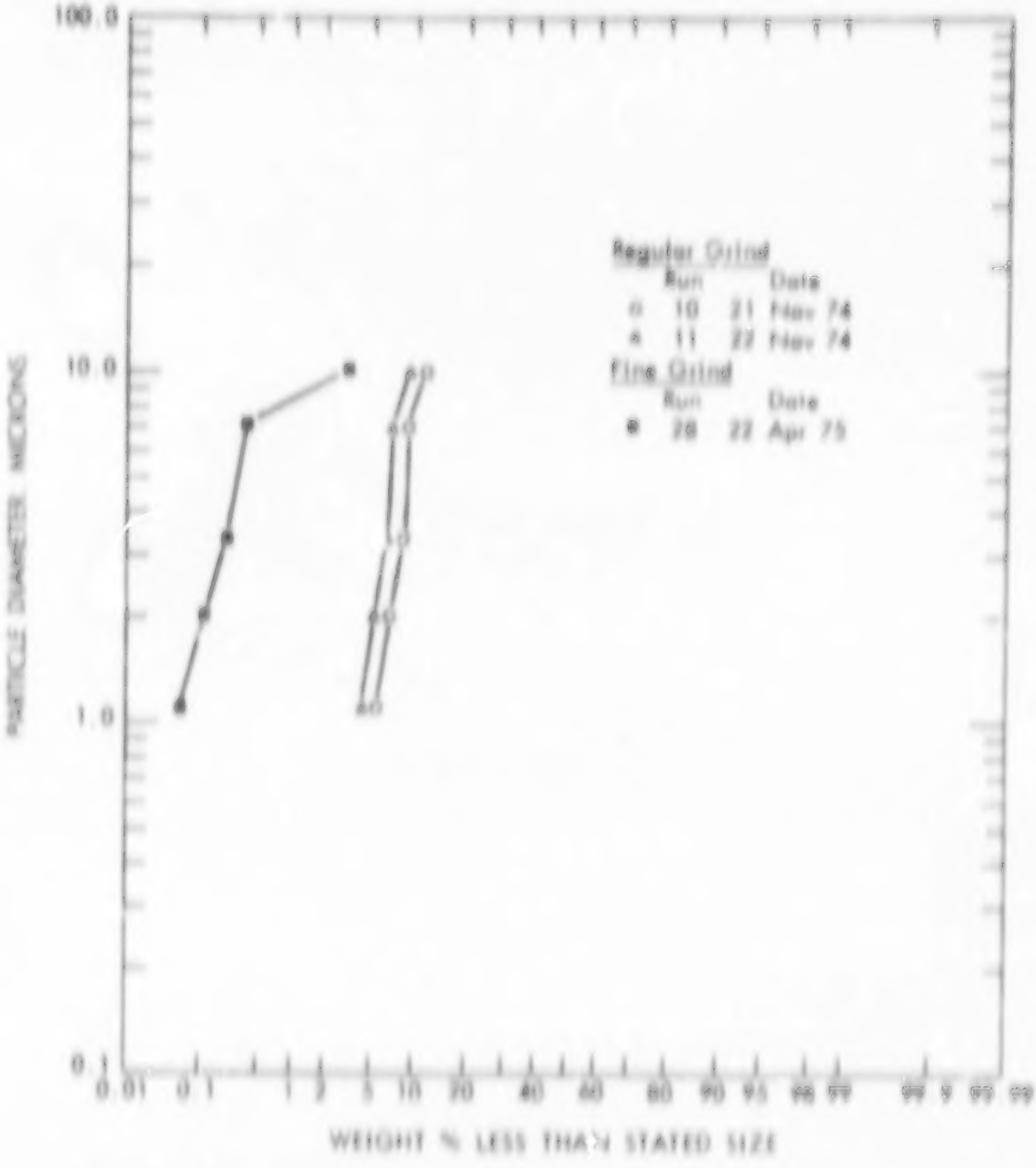

Figure 17. Particle size distribution for hammermill cyclone discharge

Table 25.—TEST DATA ON PARTICLES CAPTURED ON 1/4 BY 1/4 cm SQUARE OPENING WET PLATES FROM ADS FAN DISCHARGE AND COMPARISON TO REFUSE FUEL COLLECTED BY CYCLONE (STREAM 3)

(All percent by weight. All results on sample as received basis.)

	ADS fan discharge				RDF (stream 3) material collected by cyclone
	Monday December 30, 1974	Tuesday December 31, 1974	Thursday January 2, 1975	Monday January 6, 1975	Monday January 6, 1975
Test time (min:sec)	13:27	20:00	20:00	31:15	Composite of four subsamples
[illegible] (kg/h)	3.8	2.3	2.9	3.2	taken during same 31:15 min
Fan air flow (actual m³/s)	13.0	14.78	14.72	14.28	time as at ADS discharge
Sample composition					
Density (kg/m³)[a]	18.8	33.5	30.8	25.6	72.3
Paper (%)	21.2	29.5	11.2	14.2	68.7
Plastic (%)	13.3	32.5	8.2	15.2	4.8
Wood (%)	0	0	0	0	2.1
Glass (%)	0	0	0	0	1.8
Magnetic metal (%)	0	0	0	0	0
Other metal, (%)	0	1.0[c]	0	0	0.2
Organics (%)	0	0	0	0	7.8
Miscellaneous (%)[b]	65.4	37.2	72.6	70.2	15.5
Proximate and ultimate analysis					
Heating value (kJ/kg)				17,817	14,612
Moisture (%)				7.17	20.23
Ash (%)				11.77	10.21
Volatile matter (%)				69.38	57.13
Fixed carbon (%)				11.68	9.16
Carbon (%)				40.03	38.13
Hydrogen (%)				5.84	3.81
Oxygen (by difference) (%)				36.10	23.53
Sulfur (%)				0.20	0.13
Nitrogen (%)				0.13	0.84
Chemical analysis (wt. %)					
Fe (Fe₂O₃)				.31	1.13
Al (Al₂O₃)				2.17	1.26
Ca (CaO)				0.41	5.03
Mg (MgO)				0.22	2.03
Na (Na₂O)				0.003	0.21
K (K₂O)				0.06	0.23
Size (mm)					
Percent larger than 51.3				0	0
Percent less than 51.3				100.0	100.0
Percent less than 38.1				93.1	91.2
Percent less than 19.1				38.5	58.6
Percent less than 9.5				8.8	30.2
Percent less than 4.8				3.3	13.9
Percent less than 2.4				1.8	10.5
Particle size					
Geometric mean diameter (mm)				13.5	12.7
Geometric standard deviation				1.71	2.1

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[a] Uncompacted density material (as fluffy).

[b] Miscellaneous consists of the following: grass, paper fibers, threads, rug fibers, cloth fibers, small pieces of rubber, dust particles, feathers, and [illegible].

[c] Aluminum foil.

As mentioned earlier, another series of mass emission (and particle size) tests was conducted on the ADS system when fine grind RDF was being produced. Data from these tests (Table 24) showed that emissions averaged 57.0 kg/hr (125.6 lb/hr), which is about twice as high as the average for the regular grind tests. Perhaps more importantly, the average emission rate was 2.74 kg/Mg (5.47 lb/ton), about three times higher than that for regular grind refuse. The reduced processing rate for fine grind necessitated reduced air flow in the ADS system, which may have impaired removal efficiency in the ADS cyclone. The particle size distribution of the ADS emissions during the fine grind tests was similar to those during regular grind tests (Figure 16) and certainly did not indicate any increase in the percent of particles smaller than 10 μm. On this basis, it can be concluded that decreasing the grind size does not increase the percentage of fine particles greater than 10 μm in the ADS emissions.

HM Emissions--

During the same three periods when the ADS emissions were measured, similar tests were also carried out on the discharge from the hammermill (HM) cyclone. As expected, the emissions from the HM are less than from the ADS system, but the data for regular grind RDF cover a wide range of 0.008 to 3.9 kg/hr (0.02 to 8.6 lb/hr). Emissions measured in the first two tests (November 1974) are much lower than those measured in the three tests later in July 1975. Reasons for this variation are not known, but confidence in the July 1975 tests is better because the HM cyclone had been cleaned out and inspected on the day preceding the July 1975 tests.

If it is assumed that the July 1975 regular grind tests are most representative, then comparisons with the fine grind tests in April 1975 lead to the conclusions that HM fine grind emissions on an hourly basis are somewhat lower, averaging 2.8 kg/hr (6.1 lb/hr) versus 3.4 kg/hr (7.5 lb/hr), but that the emission factors are about the same, approximately 0.13 kg/Mg (0.26 lb/ton). In any case, it is evident from the data that the emission rate from the HM is considerably less than that from the ADS system.

The emission test data from the HM cyclone (Appendix C) show that the effluent gas temperature was about 14°C (25°F) above ambient and that it contained a relatively high moisture content (≈ 4% moisture by volume) being near saturation. This result verifies the expectation that the HM causes a temperature increase and removes some moisture from the refuse stream.

Particle size distribution tests were also conducted on the effluent from the HM cyclone as shown in Figure 17. As was the case for the ADS cyclone effluent, the tests showed that most of the particulate matter (≈ 80%) was greater than 10 μm in size.

Comparison of the particle size distribution for regular grind and fine grind RDF (Figure 17) seems to indicate that a greater portion of the emissions were smaller than 10 µm for regular grind RDF than for fine grind RDF. However, this is probably a result of the fact that the regular grind particle size tests were done at the same time as the November 1974 mass emission tests, which were much lower than in succeeding tests. No particle size tests were carried out during the later tests in June 1975.

Potentially Hazardous Air Emissions (Bacteria and Virus Emissions)

Processing of municipal solid wastes, as is done in preparing the RDF at the St. Louis operation, does involve materials that undoubtedly contain some pathogens. Part of the environmental evaluations included some preliminary tests to quantify bacteria and virus levels in the air streams emitted from the ADS cyclone, HM cyclone, and the RDF storage bin. Levels in suburban ambient air were also determined to provide some basis for comparison. Samples were taken at the following locations:

- Air exhaust duct leading from the ADS and HM cyclones.
- Inside walkway at top of storage bin where RDF is discharged from a conveyor belt.
- Backyard of a single family suburban residence located 32 km (20 miles) west of the refuse processing plant.

The methods of collecting samples for the ADS and HM emissions for bacterial and virus analysis were the same as those described in Appendix A for the particulate mass emission tests. The method is basically a high volume air sampling technique in which the particulate matter is collected on filter paper. Since the amount of particulate matter collected on the filter is quite high within the 1 to 10 g (15.4 to 154 grain) range, it was possible to remove most of the particulate catch from the filter, and split it into two parts, which were weighed and transferred into sterile bottles. A diagram depicting handling, disposition, and analysis requirements for the samples is shown in Figure 18.

Air samples from the top of the RDF storage bin and ambient air samples were also handled as shown in Figure 18 with the samples being obtained by use of ordinary ambient high volume particulate samplers. However, in the case of the suburban ambient air samples, the amount of collected particulate was so small that it could not be removed from the filter and analyzed separately, as was the case for the other samples (ADS, HM, and storage bin). The storage bin samples were not analyzed for virus content, and it was not possible to determine the particulate emission rate from the top of the storage bin (but it is probably much lower than that from the ADS cyclone).

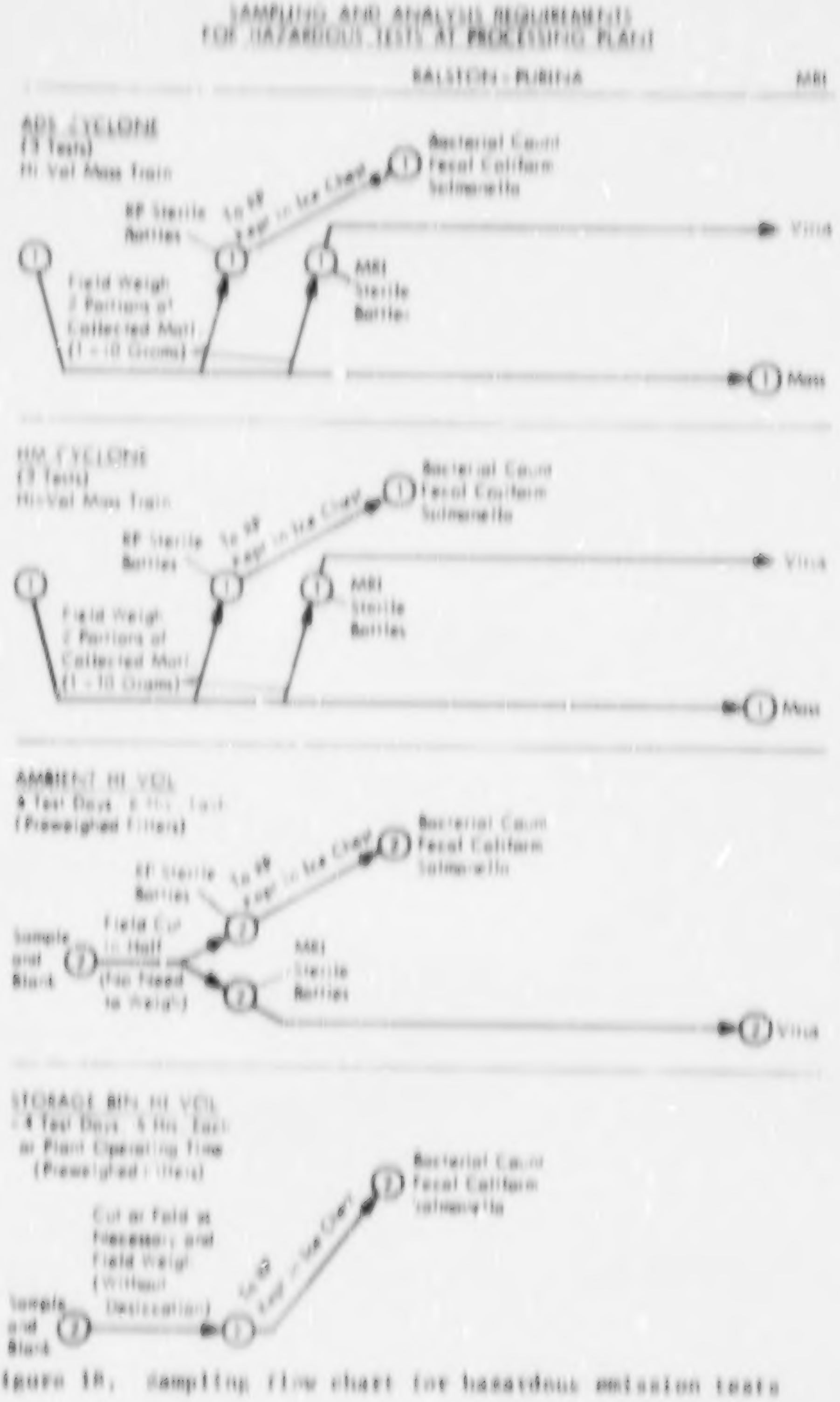
SAMPLING AND ANALYSIS REQUIREMENTS
FOR HAZARDOUS TESTS AT PROCESSING PLANT
RALSTON-PURINA
MRI
ADS CYCLONE
(3 Tests)
Hi Vol Mass Train
1
Field Weigh
2 Portions of
Collected Matl
(1 - 10 Grams)
RP Sterile
Bottles
1
To RP
Keep in Ice Chest
1
Bacterial Count
Fecal Coliform
Salmonella
1
MRI
Sterile
Bottles
Viral
1
Mass
HM CYCLONE
(3 Tests)
Hi-Vol Mass Train
1
Field Weigh
2 Portions of
Collected Matl
(1 - 10 Grams)
RP Sterile
Bottles
1
To RP
Keep in Ice Chest
1
Bacterial Count
Fecal Coliform
Salmonella
1
MRI
Sterile
Bottles
Viral
1
Mass
AMBIENT HI VOL
4 Test Days 8 Hrs Each
(Preweighed Filters)
Sample
and
Blank
2
Field Cut
in Half
(No Need
to Weigh)
RP Sterile
Bottles
2
To RP
Keep in Ice Chest
2
Bacterial Count
Fecal Coliform
Salmonella
2
MRI
Sterile
Bottles
2
Viral
STORAGE BIN HI VOL
(4 Test Days 8 Hrs Each
at Plant Operating Time
(Preweighed Filters)
Sample
and
Blank
2
Cut or Fold as
Necessary and
Field Weigh
(Without
Desiccation)
1
To RP
Keep in Ice Chest
2
Bacterial Count
Fecal Coliform
Salmonella

Figure 18. Sampling flow chart for hazardous emission tests

Results of the bacteria and virus tests are presented in Tables 26 through 28. Interpretation and evaluations of these results are provided in the following two sections: the first pertaining to the bacteria results, and the second pertaining to the methodology and results for the virus tests.

Bacteria Emissions--

Results of the bacteria tests indicate bacteria levels that are several orders of magnitude higher than in the suburban ambient air samples (Table 28). Also, several of the samples showed the presence of salmonella, which are the agents responsible for some forms of food poisoning.

It was expected that fecal coliform and other bacteria would be present in the emissions from the plant because of the nature of the material processed. However, the seemingly large numbers make it imperative that they be evaluated on some rational basis. Because of the possible significance of the results, a search of the literature was made in an effort to obtain additional information, especially that pertaining to bacteria (and virus) levels in air. This literature search did provide some useful input for evaluating and comparing the St. Louis results as discussed below.

Work by Peterson[4/] indicated that samples of raw refuse contained total bacteria ranging from 7.6 x 10^7 to 4.1 x 10^8 counts per gram (3.5 x 10^{10} to 1.9 x 10^{11} counts per pound) and fecal coliform of 2.3 x 10^4 to 4.0 x 10^5 counts per gram (1.0 x 10^7 to 1.8 x 10^8 counts per pound). These values are quite close to those found in the particulate matter discharged from the ADS and HM cyclones. In summary, as expected, particulate matter discharged from the ADS and HM cyclones contains about the same level of bacterial contamination as does the raw refuse.

Bacterial levels in air have been studied to a limited extent for some operations where airborne pathogens might present a potential hazard (i.e., refuse handling operations and sewage treatment plants).

Glysson[5/] conducted tests on bacteria in air samples taken inside and outside of an enclosed refuse handling facility.* In general, it was found that the air inside the facility contained bacteria levels of 530 to 78,000 counts per cubic meter (15 to 2,210 counts per cubic foot). Bacteria concentration in the air samples taken 30 m (100 ft) outside of the enclosed facility ranged from 134 to 629 counts per cubic meter (3.8 to 17.8 counts per cubic foot) which compares well with the ambient samples taken in St. Louis. Preliminary reports of work by Trezek[6/] at the Richmond Field Station Resource Recovery System showed initial bacteria levels of 600 to 1,770 counts per cubic meter (17 to 50 counts per cubic foot) within the facility which increased to 4,730 to 12,700 counts per cubic meter (134 to 360 counts per cubic foot) during operating periods.

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* Manual and mechanical refuse handling operations not involving air classification.

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]			[illegible]				[illegible]	
			[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]														
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]														
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Table 27. SUMMARY OF TESTS ON EMISSIONS IN STORAGE BIN

Test No. and date	Gas sampled at 1.7 m^3/min rate (m^3)	Particulate collected (g)	Bacteria concentration Bacteria counts/gram (counts/m^3)b/	Fecal coliform MPN/gram (MPN/m^3)b/	Salmonella present (pos.) absent (neg.) and group
1 (June 30, 1975)	306	6.01	248,000,000 (4,873,000)	1,400 (28)	Neg.
2 (July 1, 1975)	296	8.71	600,000,000 (17,657,000)	29,000 (862)	Neg.
3 (July 2, 1975)	311	1.08	145,000,000 (484,000)	512,000 (1,783)	Pos. D
4 (July 3, 1975)	442	52.53a/	211,000,000 (25,073,000)	1,600 (191)	Neg.

---

a/ Higher weight collected, probably due to fact that storage bin exhaust fan was on and distributing conveyor was on, which was not the case in Tests 1 through 3.

b/ Calculated value: $\left(\frac{\text{counts}}{\text{gram}}\right) \times \left(\frac{\text{grams of particulate}}{m^3 \text{ of gas sampled}}\right)$

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Salmonella [illegible]	[illegible] Plaques per [illegible]	[illegible]	[illegible]	[illegible]
1 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Neg.	0	[illegible]	0	[illegible]
2 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Neg.	0	[illegible]	0	[illegible]
3 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Neg.	0	[illegible]	0	[illegible]
4 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Neg.	0	[illegible]	0	[illegible]
[illegible]									
[illegible]									
[illegible]	None	[illegible]	[illegible]		Neg.	[illegible]		Not run	
[illegible]	None	[illegible]	[illegible]		Neg.	[illegible]		Not run	
[illegible]	None	[illegible]	[illegible]		Neg.				
[illegible]	None	[illegible]	[illegible]		Neg.				
[illegible]	None	[illegible]	[illegible]		Neg.				

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a/ [illegible]

b/ [illegible]

Other work by Peterson[7] at several incinerator plants was directed to determination of bacterial counts in refuse handling areas such as dumping floor, charging floor, and residue area, showed bacterial levels of 141 to 14,130 counts per cubic meter (4 to 400 counts per cubic foot).

Pereira[8] reported on bacterial sampling work done in and around the aeration building of a NYC sewage treatment plant, providing the following results.

Location	Bacterial counts/m³	Bacterial counts/ft³
300 m (984 ft) upwind	17	0.48
Inside aeration building	21,809	617.56
Inside aeration building exhaust stack	890	25.21
300 m (984 ft) downwind	48	1.36

In Pereira's work, several specific pathogens were identified in the air samples. It was concluded that a possible health hazard existed for the sewage plant workers and others who reside in areas where the atmosphere is contaminated by the gaseous effluent from the sewage treatment plant.

Sorber[9] conducted tests of bacterial aerosol associated with wastewater spray irrigation, and found levels that were significantly above background at distances 200 m (656 ft) from the sprayer (the greatest distance tested). This work did show that a disproportionate share of bacteriological decay occurred within the first 6 sec of exposure, and that atmospheric conditions did exert an important influence on the aerosol levels.

Thus, bacterial concentrations associated with normal refuse handling operations may range from 530 to 14,130 counts per cubic meter (15 to 400 counts per cubic foot) up to a maximum of about 70,630 counts per cubic meter (2,000 counts per cubic foot). If these aerosols were not contained, they might affect ambient levels at a distance of at least 200 to 300 m (656 to 984 ft).

Exposure of refuse workers to the increased bacterial levels could cause increases in respiratory diseases and dermatitis, but except for one report, no statistical data were available. The exception was a study by Cimino[10] on workers in the NYC department of sanitation, primarily the refuse collection personnel. This study found no evidence of increased amounts of respiratory disease in uniformed sanitation men as compared with other departmental titles. However, it did find that stationary firemen employed at the incinerators had more episodes of respiratory disease and tended to have longer periods of disability there. Cimino noted that this difference might have been due to the older average age of the firemen, but that the smoke and contaminants to which they were exposed may also have been a factor.

Even though the data previously cited indicate increased bacterial levels associated with refuse handling operations, there are no known standards of bacterial concentration limits for workers or the general populace. Such standards, if they existed, would more correctly be directed to specific bacteria rather than total bacteria levels. However, the work by Glysson[5] discussed the fact that tentative standards for hospital air prescribed 3.5 colonies per cubic meter (0.1 colonies per cubic foot) in very critical areas, up to an allowable concentration of 1,766 colonies per cubic meter (50 colonies per cubic foot) in working spaces. Such a standard hardly seems appropriate for refuse handling operation, or the general public, on the basis of values mentioned by Peterson[1] which show that bacterial levels in country air may be 1,978 counts per cubic meter (56 counts per cubic foot) and 2,541 to 3,990 counts per cubic meter (72 to 113 counts per cubic foot) in offices, schools, and factories.

On the basis of current information, it would seem prudent to limit the exposure of processing plant personnel to bacteria levels which do not exceed levels found in offices, schools, and factories. That is, bacterial counts probably should be less than 35,000 counts per cubic meter (1,000 counts per cubic foot) for in-plant air and 3,500 counts per cubic meter (100 counts per cubic foot) in ambient air. If these limits are assumed, it does appear that the bacterial levels measured at St. Louis may present a problem. Bacterial concentration in the ADS exhaust which is the largest emission source and is exhausted near ground level contained bacterial concentrations as high as 318 by 10^6 counts per cubic meter (9 by 10^6 counts per cubic foot). Even if one assumes that 90% of the particles would settle rapidly (based on previously discussed particle size data), the levels could still be about 32 by 10^6 counts per cubic meter (9 by 10^5 counts per cubic foot). If it were further assumed that the emissions are diluted by a factor of 1,000 before reaching the plant boundaries, the bacterial level could still be as high as 32,000 counts per cubic meter (900 counts per cubic foot).

Levels such as those discussed above may constitute a potential hazard, but the calculated values do not take into account possible rapid die-off expected for many bacteria. It is evident that there is a need for further testing at the St. Louis facility to measure bacterial levels for the air in and around the plant boundaries before it can be said that any hazard does exist. At this point it can only be concluded that a potential hazard may exist. More definitively, the results to date certainly do not support a conclusion that there is no potential bacterial hazard.

As a last point, it should be remembered that the mass emission data for the ADS system indicated the need for control. If efficient particulate control devices were employed on plants of this type, it is probable that they would also provide about the same efficiency of removal for bacteria. Similarly it is recommended that future plants of this type pay particular attention to control of particulate emissions and design the plant so as to minimize worker exposure.

Virus Emissions:

Many of the samples that were tested for total bacterial counts, fecal coliform levels, and for salmonella were also tested for their viral contents. These tests were performed in the Virus Laboratories of MRI. When the tests were initiated only tests for enteroviruses were planned, however, we later elected to test also for the bacterial viruses that are found in association with *Escherichia coli*. For the virus tests, samples were obtained from the following sources.

1. Particulate matter from air density separator cyclone;

2. Hammermill cyclone; and

3. Suburban ambient air.

Since low levels of viruses had been anticipated and the viruses had to be eluted from the particulate matter, preliminary processing was needed. Each air particulate sample was suspended in distilled water by a 30-sec homogenization in a Waring Blender or an Omni-mixer. The homogenate was precipitated at pH 7.0 with 0.5 M $CaCl_2$ and 0.5 M Na_2HPO_4. (Calcium hydroxyappatite is the principal product formed.) This precipitate was recovered by Buchner filtration using Whatman No. 1 paper. The precipitated material was then dissolved by chelation using 0.3 M disodium EDTA (pH 7.0). The EDTA solution (containing the viruses) was then dialyzed against distilled water to remove the EDTA. A second calcium phosphate precipitation step was performed to further concentrate and purify the sample. Following the second dialysis, part of each sample was used for viral assay, and the remainder frozen for any necessary reassays. The final samples from the concentration and purification steps were 20.0 ml each. The weight of the original particulate matter and the volume of air from which the sample was obtained were known; therefore, viral assays could be reported per gram of sample or cubic meter of air sampled.

Enteroviruses were assayed by means of standard plaque technique using the LLC-MK_2 cell line from monkey kidney and the KB cell line derived from an epidermoid carcinoma. Medium 199 supplemented with sterile newborn calf serum was the nutrient for the LLC-MK_2 cells. It was also used in the agar overlay medium for the plaque counts. The KB cells were grown in Basal Eagle's Medium supplemented with nonessential amino acids and newborn calf serum. Antibiotics (penicillin, streptomycin, and on occasions fungizone) were added to the media to suppress any bacterial contamination. Plaques were counted from 4 to 10 days after the cultures were overlayed. Neutral red (1 to 6,000) was added on the day the plaques were read and the cells were stained for approximately 4 hr at 37°C (99°F) before counting. When discrete plaques were observed, these were counted and each plaque considered as one virus. Plaque estimates (PFU = plaque forming unit) were made for some cultures which showed lysis but without discrete plaque formation. A known standard poliovirus (Type 1) was always assayed at the same time as each unknown sample so that the tissue culture sensitivity of the cultures was known for each day's testing.

Test for E. coli bacteriophages were made with the purified and concentrated sampled using standard phage techniques.[11] The host cells were fecal coliform strains isolated from sewage samples previously studied on another MRI program. Serial dilutions of the test samples were added to 4 ml volumes of melted and cooled to 42°C (108°F) agar to which an appropriate number of rapidly growing E. coli cells was added and the mixture immediately poured on the top of a prepoured layer of nutrient agar. These "sandwich" type cultures were incubated overnight after which each discrete plaque was counted and recorded. Bacteriophage titers in the samples are reported as PFU per gram or per cubic foot.

Table 26 includes the results for enteroviruses and E. coli bacteriophages for the particulates in the ADS and HM cyclone tests. Table 28 summarizes the viral and microbial data for ambient air samples taken 12 km from the processing plant.

The data obtained on the viral content of these samples are not as "clean-cut" as we would like, and the titers for the ADS and HM samples are all much higher than we had expected.

As expected, we observed no viruses in any of the ambient air samples (see Table 28). In fact, the ambient air samples were as free of viruses as the blank filter papers assayed by the same techniques. The absence of viruses in the ambient air samples was to be expected since the total bacteria in the particulates ranged from 25 to 473/m^3 (0.7 to 1.4 ft^3).

Based upon the high levels of fecal coliforms in the tests of the ADS and HM cyclone samples, it is not surprising that our enterovirus data are hard to interpret. Our general impression is that the samples contained appreciable levels of enteroviruses and probably many other agents capable of destroying tissue culture cells.

The plaques observed in many cases were typical of enteroviruses including poliomyelitis, but we made no attempts to classify the agents. The data in Table 26 for enteroviruses (based upon tissue culture destruction) clearly prove that the air samples collected from above the ADS and HM operations contained animal viruses at least partly of fecal origin. The levels of these agents are quite high, especially in comparison with data reported by Peterson[12] which showed enteric virus density in municipal solid waste of 0.12 PFU/g (1.65 PFU/lb). Peterson's[12] report also mentions that sewage may contain enteric virus densities of 0.2 to 4.0 PFU/ml (5.3×10^{-5} to 1.1×10^{-3} PFU/gal.).

The E. coli bacteriophage levels in the ADS and HM samples were nearly equal to, or higher than, the number of E. coli determined by fecal coliform test procedures. These E. coli bacteriophage data confirm the high degree of fecal contamination reported. The higher bacteriophage counts compared to the coliform counts can be explained by several means, and we cannot be certain which is the correct reason. Bacteriophage of E. coli are generally more difficult to kill than E. coli; therefore, the higher phage counts can be due to longer or greater survival of the bacterial virus than the bacteria. Each E. coli can give rise to multiple phage if the lytic cycle is completed. Therefore, the higher phage titers in Table 26 may be a reflection of some phage virus reproduction on the bacteria found in the waste materials. The action of the phage on the E. coli may also reduce the E. coli counts. The high levels of bacteriophage for E. coli are also not surprising in the light of positive salmonella tests. E. coli and E. coli bacteriophages are generally present in feces in much higher levels than salmonella.

Again, as was previously discussed with regard to bacteria, it is difficult to judge the significance of the virus levels reported in Table 26 because there are no standards for virus levels in air, and in fact, very little work has been done in measuring virus levels in air. The previously cited work by Peterson[12] was directed to problems associated with virus levels in disposable diapers which, contained in municipal solid waste, showed that disposable diapers may constitute 0.6 to 2.5% by weight of the municipal solid waste. Peterson identified poliovirus 3 and echovirus 2 in the waste matter contained in some of the diapers and concluded that these virus-laden materials will present a potential threat to the health of those who handle the municipal solid waste.

Since most municipal solid waste will contain some disposable diapers and other fecal animal wastes, it would be expected that associated emissions, such as the ADS and HM, would contain some virus and might therefore present a potential hazard.

Although it can be concluded that a potential hazard (due to virus emissions) may exist, it is evident that additional testing of the ambient air in and around the plant will be necessary in order to evaluate the potential hazard in terms of increased virus (and bacteria) levels in the ambient air caused by processing plant operations.

Future plants of this type will need to control ADS particulate emissions, and every effort should be made to minimize worker exposure to the bacterial- and viral-contaminated emissions.

Cost of Environmental Control for Particulate Emissions

Particulate emission measurements and other considerations have indicated a need for control of ADS emissions. Control of these emissions has been considered at other facilities, and fabric filters appear to be a feasible control technique which should provide very high removal efficiency. In fact, a small filter system was installed at the U.E. power plant for control of emissions from the Atlas bin when RDF is transferred into the bin from the receiving building.

The ADS system at the St. Louis processing plant is not equipped with any control device other than a settling chamber, but personal contact with one manufacturer has indicated that the FOB cost of a suitable filter, handling 14.2 m^3/s (30,000 cfm), would be about $60,000, and total installed cost would be about $100,000.

Use of a fabric filter for control of emissions from the ADS cyclone would require materials to resist internal condensation problems (galvanized metal or coated surfaces), and the bags would have to be resistant to rot and mildew. The filter system would also probably be of modular design for shaker type automatic cleaning with special attention to design of inlet manifolds, and to hopper angles and removal techniques, etc., in order to avoid bridging problems. Simple equipment that is as maintenance free as possible would be recommended. Fabric filters generally require about 1 kPa (4-in. W.G.) pressure drop, which must be taken into account in specifying the ADS fan.

WATER EFFLUENTS

The only liquid effluent from the processing plant occurs from periodic washdown of the asphalted processing area of the plant (not including the floor of the raw refuse receiving building). This cleanup effort removes dust and settled particles, much of which occurs due to blowoff from conveyor belts and ADS cyclone emissions. It was of interest to determine the quantity and character of runoff from this washdown activity.

During the first period of air emission tests (November 18 to 22, 1976), two washdowns took place--one on November 20, 1976, and another 2 days later on November 22, 1976. The test procedure used during these periods was to determine the quantity of water being used over the length of the washdown period (≈ 1 hr) and to collect samples of the runoff at various points around the washdown area. These samples were composited in one container and a portion of this composite sample, as well as a sample of the raw water, was analyzed.

A tabulation of the data obtained for the two washdown periods is presented in Table 29. These data show that the washdown rate was about 2.2 liters/s (35 gal/min), and total runoff was about 8,000 liters (2,000 gal.). Comparison of analysis data for the raw water and the runoff indicates a large increase in TSS as expected. There was also a significant increase in BOD and COD. However, the effluent quantity of approximately 8,000 liters (2,000 gal.) seems relatively small, considering the fact that it occurs only one or two times per week.

[illegible]

	Tank No. 1		Tank No. 2		Tank No. 3		Tank No. 4	
Date	[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]		[illegible]		[illegible]		[illegible]	
	Tap water	Composite runoff sample	Tap water	Composite runoff sample	Tap water	Composite runoff sample	Tap water	Composite runoff sample
[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
pH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
[illegible]					[illegible]	[illegible]	[illegible]	[illegible]
[illegible]					[illegible]	[illegible]	[illegible]	[illegible]
[illegible]					[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

A second pair of washdown tests were also carried out in July 1975, and results are included in Table 28. The primary purpose of this second pair of tests was to determine bacterial levels in the runoff samples. It is evident, from the data in Table 28, that there were large increases in the total bacteria and fecal coliform levels in the washdown effluent. However, analysis of raw river water samples (which were obtained in conjunction with tests at the power plant) showed that the bacteria levels in the river itself may range as high as 940,000 counts per milliliter with fecal coliform levels up to 110,000 MPN/100 ml. It would appear that although the bacteria levels in the washdown effluent are quite high, they may not be especially significant since they are on about the same order as levels that may occur in the nearby river water at this location.

ASSESSMENT OF LEACHABILITY OF PRODUCTS FROM THE REFUSE PROCESSING PLANT

Operation of the City of St. Louis refuse processing plant in conjunction with combined firing of coal + refuse in a Union Electric Company utility boiler results in four materials that could be landfilled: fly ash, bottom ash, magnetic belt rejects, and RDF. Boiler fly ash is normally sold, but occasionally it may be landfilled when markets are not available. Boiler bottom ash (sluice solids) is always removed hydraulically from the boiler and deposited in an impoundment area where the solids settle out and the overflow effluent is discharged into the Meramec River. Refuse derived fuel (RDF) is normally combined with coal as fuel input to the boiler. However, in the event of boiler maintenance downtime, RDF may be landfilled. The magnetic belt rejects, which are the air density separator (ADS) heavy fraction less the magnetic metal, are always landfilled at the City of St. Louis operated landfill adjacent to the processing plant.

It is important to know what constituents might be leached from these materials which could contaminate surface water or groundwater. For this reason, samples of the four landfill materials were subjected to a series of tests to identify potential leachate problems. Details of the tests and the results are presented next.

Sample Preparation

Procedures for assessing leachability of materials are only in the developmental stage and methods utilized were based on techniques suggested by knowledgeable personnel at EPA laboratories in Cincinnati, Ohio. Samples of the following four materials were obtained.

From Union Electric Meramec Power Plant Unit 1:

Fly ash: coal + refuse
Sluice solids (bottom ash): coal + refuse

From City of St. Louis Processing Plant:

#2 = cyclone discharge (RDF)
#5 = magnetic belt rejects

These four samples were delivered to the Ralston Purina Company Research 900 Laboratory. Standard sample preparation procedures for refuse samples were used, which means that each sample was dried and then ground to a fine powder using a laboratory mill. The sample powder was then immersed in distilled water for 2 days (48 hr). The samples were continuously agitated during that period by means of a laboratory shaker table. At the end of the 2-day period, the amount of material leached away was determined by drying and reweighing the solids, and the liquid (leachate) was chemically analyzed. The fact that ground samples were used should allow maximum leaching to occur within the 2-day test period because of increased sample surface area.

The #5 sample contained 37.1% metal, which was too high an amount to be ground by the laboratory grinder; therefore, the metal fraction was hand separated, not ground, and processed as a separate sample. Metal content of 37.1% for #5 is higher than average ([illegible]) but well within the range of daily values reported for the 1-year test period.

All of the sample material was completely saturated with distilled water to the point where excess water existed. The distilled water to sample material ratio used was 2:1 except for RDF. Due to its light, fluffy nature, RDF completely absorbed twice its weight in distilled water. Therefore, a distilled water to sample material ratio of [illegible] was used to completely saturate the sample and result in excess water.

The main concern regarding landfill leachate is contamination of groundwater that may find its way into the drinking water supply. Therefore, the leachate was analyzed for materials for which national drinking water standards have been set plus BOD and COD. Also, nitrite levels were determined because nitrite could be oxidized into nitrate if the correct conditions are present.

Laboratory Results

The laboratory results obtained are presented in Table [illegible]. Analysis of a blank sample of distilled water yielded no constituents found within the low level detection ability of the laboratory methods.

Table 31. ANALYSIS OF LABORATORY PRODUCED LEACHATE

Constituent	Blank	Coal + refuse: Fly ash	Coal + refuse: Sludge solids	S2 Cyclone discharge (RDF)	S5 Magnetic belt rejects: Nonmetallic fraction[d]	S5 Magnetic belt rejects: Metals[d]	S5 Magnetic belt rejects: Total[e]
Moisture (%)[a]	-	0.20	11.1	33.1			26.0
Leachables (%)[b]	N.D.[c]	0.4232	0.3824	1.6394	0.7340	0.1336	0.5126
Level (mg/l)							
BOD	N.D.	271.9	393.5	502.1	394.5	378.1	407.6
COD	N.D.	136.3	1,409	7,038	5,962	898.5	4,387
Nitrites (as N)	< 0.025	0.021	< 0.025	0.038	< 0.025	< 0.025	< 0.025
Nitrates (as N)	< 0.002	0.080	< 0.002	< 0.002	23.12	< 0.002	8.250
Arsenic	< 0.10	0.53	< 0.10	0.48	0.90	< 0.10	0.65
Barium	< 0.20	16.8	< 1.0	< 1.0	20.6	< 1.0	7.36
Cadmium	N.D.	< 0.05	< 0.25	< 0.10	< 0.05	< 0.05	< 0.05
Chromium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide	< 0.05	< 0.05	< 0.05	< 0.05	< 0.25	< 0.25	< 0.25
Lead	N.D.	< 0.20	< 0.40	< 1.0	< 0.20	< 0.20	< 0.20
Mercury	N.D.	< 0.05	< 0.05	< 0.05	< 0.25	< 0.05	< 0.25
Selenium	N.D.	1.51	N.D.	0.90	1.62	0	1.02
Silver	N.D.	N.D.	N.D.	N.D.	N.D.	0	0

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a/ Moisture as original sample.

b/ Percent of sample weight loss due to leaching.

c/ N.D. signifies none detected.

d/ S5 sample separated into 62.88% by weight nonmetallic fraction; 37.12% by weight metals fraction.

e/ Mathematically combined total of nonmetallic and metal fraction.

Extraction dilution (solid:liquid)

Blank -	200 ml distilled water
Fly ash -	100 g sample + 200 ml distilled water
Sludge solids -	100 g sample + 200 ml distilled water
S2 (RDF) -	30 g sample + 200 ml distilled water
S5 (nonmetallic fraction) -	60 g sample + 120 ml distilled water
S5 (metal fraction) -	100 g sample + 200 ml distilled water

As expected, the metal fraction of the magnetic belt reject sample added little to the leachate except for BOD. Leachate from RDF had the highest COD and BOD.

Comparisons to drinking water standards for the leachate produced by the particular extraction dilutions used in the laboratory procedure are shown in Table 11. Unfortunately, the drinking water standard limits are below the detection ability of the laboratory procedures for arsenic, cadmium, chromium, lead, and mercury. In analyzing these data, it was assumed that the "less than" values reported (Tables 10 and 11) are the maximum values that could exist. All comparisons are made utilizing this maximum value assumption.

The drinking water standards were exceeded in the laboratory produced leachate solutions for all elements except nitrate, cyanide, and silver in all samples; and barium in sluice solids and RDF.

Nitrites were at low levels. Therefore, even if they were all converted to nitrate, it would not significantly change the reported nitrate levels.

The nonmetallic fraction of SS does exceed the nitrate standard. However, when it is combined with the metallic fraction, the nitrate concentration is below the standard.

Comparisons and Evaluation of Results

The statement that drinking water standards were or were not exceeded pertains specifically to leachate from the extraction dilutions used. Also, the RDF dilution was much higher than the others. The various constituent levels of RDF leachate cannot be converted to the lower dilution ratios used for the other samples. At lower dilution levels, RDF simply absorbs the water, and it is doubtful how much leachate would result.

Any of the constituents in any of the samples could be lowered to the drinking water standards if a high enough dilution ratio were used. To obtain a better comparison, each leachate constituent level was converted to grams per megagram (lb/ton) of material by the following formula.

Grams of a constituent removed by leaching per megagram of material =

$$\frac{(\text{mg/liter constituent level})\ (\text{ml distilled water/g of sample})}{(1{,}000\ \text{mg/g})\ (1{,}000\ \text{ml/liter})\ (\text{Mg}/1 \times 10^{6}\ \text{g})}$$

Table 31. COMPARISON OF LABORATORY PRODUCED LEACHATE TO DRINKING WATER STANDARDS

Constituent	Drinking water standards a/	Coal + refuse: Fly ash	Coal + refuse: Sluice solids	S2 Cyclone discharge (RDF)	S5 Magnetic belt rejects
Extraction dilution (ml distilled water/g of sample)		2.00	2.00	6.67	2.00
Level (mg/l)					
BOD	-	20.9	393.5	302.1	457.6
COD	-	116.3	1,488	7,016	4,087
Nitrites (as N)	-	0.021	< 0.145	0.018	< 0.015
Nitrates (as N)	10.0	0.090	< 0.022	< 0.022	8.258
Arsenic	0.05	0.93	< 0.10	0.48	0.65
Barium	1.0	16.8	< 1.0	< 1.0	7.26
Cadmium	0.010	< 0.05	< 0.05	< 0.10	< 0.05
Chromium	0.05	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide	0.2	< 0.05	< 0.05	< 0.05	< 0.05
Lead	0.05	< 0.20	< 0.40	< 1.0	< 0.20
Mercury	0.002	< 0.05	< 0.05	< 0.05	< 0.05
Selenium	0.01	1.53	0	0.90	1.02
Silver	0.05	0	0	0	0

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a/ Environmental Protection Agency, "National Interim Primary Drinking Water Standards," Part 141, Federal Register, Vol. 40, No. 51, Washington, D.C., March 14, 1975.

(Pounds of a constituent removed by leaching per ton of material =)

$$\left[\frac{\text{(lb/gal. constituent level) (gal. distilled water/lb of sample)}}{\text{(ton/2,000 lb)}}\right]$$

The above equation was used to calculate the results shown in Table 12. These results represent the amount of each constituent which is removed by leaching, regardless of the extraction dilution ratio used. The next step in evaluating the data was to make a ranking of each constituent level according to the drinking water standards. This was accomplished by calculating the liters of water per megagram (gallons per ton) that would be necessary to dilute a constituent to drinking water standards by the following formula.

Liters per megagram of dilution water needed =

$$\frac{\text{g/Mg constituent level removed by leaching}}{\text{mg/liter drinking water standard (g/1,000 mg)}}$$

(Gallons per ton of dilution water needed =)

$$\left[\frac{\text{(lb/ton constituent level removed by leaching)}}{\text{(lb/gal. drinking water standard)}}\right]$$

Results of this calculation are shown in Table 13. Interpretation of the relative magnitude of these results was done in two ways. First, by comparing the amount of dilution required first between elements within a sample, and second, by comparing the amount of dilution required between samples for a given constituent. Table 14 depicts the ranking from highest to lowest dilution required to meet the drinking water standards for each constituent within a given sample. Nitrates and cyanide consistently ranked as the two lowest constituents. Selenium ranked highest with mercury second highest for all samples except sluice solids which contained no selenium and had mercury ranking highest.

The most important conclusion is as shown in Table 13. Selenium in all the samples except sluice solids had much higher dilution requirements than any of the other constituents. Also, as shown in Table 10, the levels of selenium found in the laboratory dilutions were above the detection ability of the laboratory methods. Therefore, the dilution required for selenium to meet the drinking water standards is not prejudiced by the necessity of assuming the actual level to be that of the laboratory procedure detection level (as was done for many of the other constituents).

Table 32. MATERIAL REMOVED BY LEACHING (g/Mg)a/

Constituent	Coal + refuse Fly ash	Coal + refuse Sluice solids	S2 Cyclone discharge (RDF)	S5 Magnetic belt rejects
BOD	61.8	787.0	3,367	915.2
COD	232.6	2,976	46,773	8,154
Nitrites (as N)	0.042	0.030	0.120	0.03
Nitrates (as N)	0.180	0.066	0.167	16.516
Arsenic	1.86	0.20	3.20	0.13
Barium	33.6	2.0	6.67	14.08
Cadmium	0.10	0.10	0.67	0.10
Chromium	1.00	1.00	3.33	1.00
Cyanide	0.10	0.10	0.33	0.10
Lead	0.40	0.80	6.67	0.40
Mercury	0.10	0.10	0.33	0.10
Selenium	3.06	0	6.00	2.04
Silver	0	0	0	0

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a/ Less than (<) values listed in Tables 30 and 31 were assumed to be the actual value for comparison purposes.

Table 33. AMOUNT OF DILUTION WATER NEEDED FOR LEACHATE TO MEET DRINKING WATER STANDARDS (ℓ/Mg)

Constituent	Coal + refuse Fly ash	Coal + refuse Sluice solids	S2 Cyclone discharge (RDF)	S5 Magnetic belt rejects
Nitrates (as N)	18.0	6.6	16.7	1,652
Arsenic	37,200	4,000	64,000	2,600
Barium	33,600	2,000	6,670	14,080
Cadmium	10,000	10,00.	66,700	10,000
Chromium	20,000	20,000	66,600	20,000
Cyanide	500	500	1,650	500
Lead	8,000	16,000	133,400	8,000
Mercury	50,000	50,000	165,000	50,000
Selenium	306,000	0	600,000	204,000
Silver	0	0	0	0

Table 34. RANKING OF LEACHATE CONSTITUENTS - DILUTION REQUIRED TO MEET DRINKING WATER STANDARDS

(Ranking: highest to lowest dilution required)

Coal + refuse		#7	#5
Fly ash	Sluice solids	Cyclone discharge (RDF)	Magnetic belt rejects
Selenium	Mercury	Selenium	Selenium
Mercury	Chromium	Mercury	Mercury
Arsenic	Lead	Lead	Chromium
Barium	Cadmium	Cadmium	Barium
Chromium	Arsenic	Chromium	Cadmium
Cadmium	Barium	Arsenic	Lead
Lead	Cyanide	Barium	Arsenic
Cyanide	Nitrates	Cyanide	Nitrates
Nitrates		Nitrates	Cyanide

Note: No silver found in any sample.
No selenium found in sluice solids.

Ranking of the four samples for dilution required per constituent is shown in Table 35. RDF had the higher ranking except that magnetic belt rejects ranked highest for nitrates and fly ash ranked highest for barium. The other samples were mixed in ranking or no clear trends were present.

Suggestions for Future Work

The leachate produced for these tests was the result of only a single set of laboratory test conditions. Therefore, it might be well to investigate the effects of immersion time, agitation, and amount of extraction dilution. Also, distilled water was used for these tests, but some literature sources report acid or basic pH in landfilled leachate. Therefore, more work may be needed to determine the effects of pH on leachate production. Further work is also needed to compare leachate produced in the laboratory with leachate from a landfill, and to compare coal-only fly ash and sluice solids leachate with coal + refuse leachate.

Another area of study is related to the fact that in St. Louis the raw municipal refuse is a raw material which may be landfilled following various pretreatment methods. First, raw refuse may be landfilled, producing raw refuse leachate, which is the case for many of the suburban areas adjacent to the City of St. Louis. Second, raw refuse may be incinerated and the incinerator bottom ash landfilled, producing incinerator ash leachate. This is currently the procedure used by the City of St. Louis except for that portion of the collected refuse routed to the processing plant. Thirdly, raw refuse may be processed at the City of St. Louis Refuse Processing Plant. Here two situations may be present. Normally, when the Union Electric boiler is in operation, leachate would be from magnetic belt rejects, boiler sluice solids, and possibly fly ash. If the boiler is not in operation, then leachate would be from magnetic belt rejects and RDF. Therefore, additional work is needed so that comparisons can be made between leachate from raw refuse, incinerator bottom ash, and the processing plant and utility boiler landfilled materials. Such information would greatly aid in the total environmental assessment of each of the three methods of municipal refuse disposal.

Following is a summary of areas recommended for further study.

1. Effect of laboratory extraction dilution - ml liquid/g of sample (gal. liquid/lb of sample).

2. Effect of laboratory extraction liquid pH.

3. Effect of laboratory immersion time (number of days in extraction liquid).

4. Effect of laboratory agitation (shaker table versus none).

Table 35. RANKING OF LEACHATE SAMPLES BASED ON DILUTION REQUIRED TO MEET DRINKING WATER STANDARDS

	Ranking			
Constituent	Highest	Next highest	Next lowest	Lowest
Nitrate (as N)	MBR	Fly ash	RDF	SS
Arsenic	RDF	Fly ash	SS	MBR
Barium	Fly ash	MBR	RDF	SS
Cadmium	RDF	SS	Fly ash	MBR
Chromium	RDF	MBR	Fly ash	SS
Cyanide	RDF	MBR	Fly ash	SS
Lead	RDF	SS	Fly ash	MBR
Mercury	RDF	MBR	Fly ash	SS
Selenium	RDF	Fly ash	MBR	*
Silver	*	*	*	*

Legend: RDF = Refuse derived fuel.
MBR = Magnetic belt rejects.
SS = Sluice solids.

5. Comparison of coal-only versus coal + refuse leachate for fly ash and sluice solids.

6. Comparison of laboratory versus landfill-produced leachate.

7. Comparison of leachate from raw municipal refuse, incinerator bottom ash, and the landfilled materials from the refuse processing plant and utility boiler.

SOUND SURVEY

Another environmental consideration for operations at the processing plant was noise levels, especially that associated with the 932.5 kW (1,250 hp) grinder. Since noise levels were of concern, a sound survey was carried out that included analysis of noise levels at several locations in and around the plant. The test procedures for this sound survey and evaluation of the results are discussed next.

Test Procedure

The following General-Radio test equipment was used for the sound survey.

Model 1558 BP Portable Octave Band Noise Analyzer;

Model 1560 P5 One Inch Ceramic Microphone; and

Model 1562 A Calibrator.

The noise analyzer with microphone was calibrated each day of the sound survey. Meter response range was 44 to 150 decibels (dB). A zero meter response was listed as < 44 dB. The portable analyzer was hand-held, and the microphone was placed 1.4 m (4.5 ft) above grade at each measurement location.

Sound levels in decibels at slow meter response were measured at 10 octave bands plus the A scale (dBA). The octave band measurements show the overall sound spectrum in terms of decibels versus frequency. This information will be useful for acoustical engineering, land use zoning, and other activities related to the total sound spectrum produced. Octave bands used are as follows:

OCTAVE BANDS USED

Octave band No.	Frequency (Hz) Band center	Lower cutoff	Upper cutoff
1	31.5	22.3	44.6
2	63	44.6	89.2
3	125	88.4	177
4	250	177	354
5	500	354	707
6	1,000	707	1,414
7	2,000	1,414	2,820
8	4,000	2,828	5,656
9	8,000	5,656	11,310
10	16,000	11,310	22,620

The A scale sound levels will be useful to those interested in O.S.H.A. applications. (O.S.H.A. regulations are defined in terms of dBA measurements.)

Measurements were made (a) when the plant was conducting normal preparations, and (b) when the plant was not operating, to identify the levels of usual background noise. Any sound measurements of operating equipment will be the combination of the sound produced by the equipment plus the background sound. For the City of St. Louis Refuse Processing Plant, the background sound sources consist of the following.

Location of Background Sources

Background source	Direction from plant
Interstate Highway 55	West
Mississippi River	East
City Incinerator	North
City Truck Maintenance Garage	Southwest

Table 16 lists the measurement locations. Sixteen locations were used to monitor noise levels in the following three general areas.

1. Employee work areas (Locations 1 through 8).

2. Light sound level equipment areas (Locations 9 through 11).

3. Sound levels along processing plant perimeter (Locations 12 through 16).

Table 36. SOUND SURVEY MEASUREMENT LOCATIONS

No.	Description	Location
1	Control room	Inside operator's control room, approximately center of room.
2	Shop	Inside maintenance shop and storage room located next to hammermill. Approximately center of room.
3	Packer control	0.5 m west of packer control panel east-west center line. Location where operator would stand to operate controls.
4	Receiving building	0.9 m south of raw refuse receiving building north wall on building north-south center line.
4.1		Front-end loader operating at maximum load. No refuse trucks dumping.
4.2		Refuse trucks dumping. Front-end loader at engine idle.
5	Front-end loader	Inside operator's cab of front-end loader used inside receiving building to push raw refuse onto the raw refuse receiving belt conveyor. Cab doors closed.
6	ADS heavies discharge	0.5 m east of edge of ADS heavies belt conveyor tail pulley.
7	Magnetic belt discharge	1.3 m northwest from edge of nuggetizer frame. Location just outside door to drivers compartment in magnetic belt reject truck. Location when truck is positioned to fill front 1/3 of truck body.
8	Fe metal discharge	0.9 m south of edge of ferrous metal belt conveyor. Location just outside door to drivers compartment of ferrous metal truck. Location when truck is positioned to fill front 1/3 of truck body.
9	Hammermill	1.1 m east of edge of hammermill frame on mill east-west center line. Location on top of concrete base for hammermill.
10	Nuggetizer	1.1 m east from edge of nuggetizer frame on nuggetizer east-west center line.
11	ADS fan exhaust	15.1 m south of edge of fan exhaust duct on duct north-south center line.

There is a truck driveway on the east, south, and west sides of the processing area. The following locations are along the outside edge of this driveway.

No.	Description	Location
12	East drive	℄ mill: 19.8 m east of edge of hammermill frame on mill east-west center line.
13	East drive	℄ storage bin: 16.3 m east of edge of storage bin on bin east-west center line.
14	West drive	℄ ADS: 11.9 m west of edge of ADS air separation chamber on chamber east-west center line.
15	West drive	℄ storage bin: 21.1 m west of edge of storage bin on bin east-west center line.
16	South drive	℄ storage bin: 17.2 m south of edge of storage bin on bin north-south center line.

Figure 19 is a plot plan showing the measurement locations.

Sound Survey Results

Tables 17 and 18 list the sound measurement results. The background sound is relatively low, being less than 60 dB above 250 Hz center band frequency. The major background is low frequency sound from adjacent Interstate Highway 55. The major sound from the processing plant is in the lower frequencies; the hammermill, nuggetizer, ADS fan exhaust, front-end loader, and raw refuse trucks are the principal contributors.

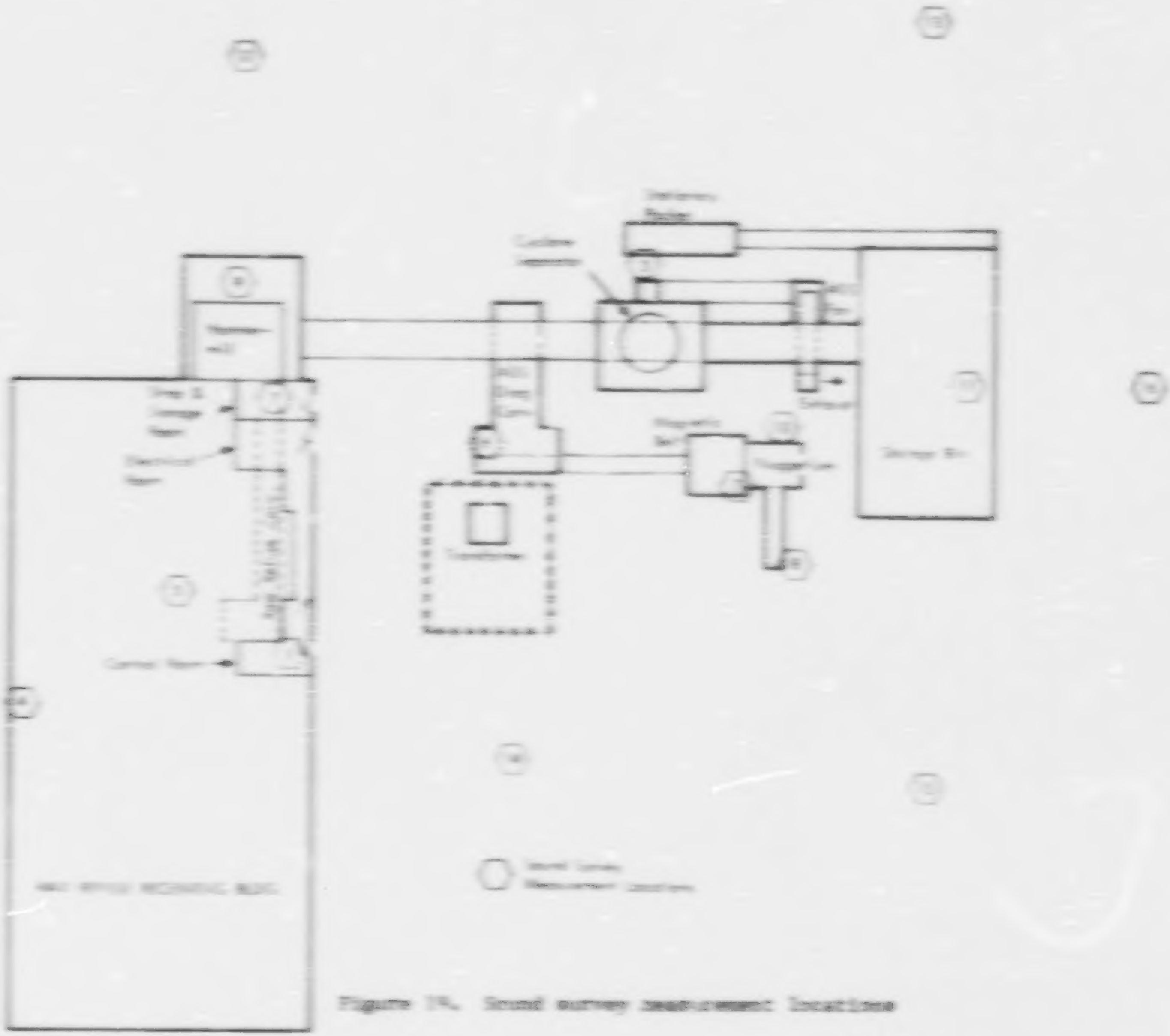
Location 7 had the highest sound level in the upper frequencies. This location was closest to the working mechanisms of the nuggetizer, and also underneath the metal nuggetizer feed chute. This feed chute receives the magnetic metal from the magnetic separator belt, and its sound production is primarily due to the metal particles striking the metal chute. Both the nuggetizer and the magnetic belt are acting together to produce higher sound levels in the 1,000 to 8,000 Hz center band frequencies.

Location 4.1 is with the front-end loader working at maximum load. Location 5 shows that, with the operator's cab doors closed, the cab is reducing the engine sound except for center band frequencies 31.5 and 250 Hz. Fortunately, these frequencies do not have a full effect on the A scale, and the dBA is below the U.S.H.A. limit of 90 dBA.

Location 4.2 is inside the receiving building at the same physical point as 4.1. These measurements are highest when the raw refuse trucks discharge refuse onto the building floor. These refuse trucks are not dump trucks with a tilting truck box. Instead, the trucks utilize a mechanism which rapidly shakes the cargo compartment to discharge the raw refuse. Measurements were taken during the shaking action. However, this action lasts for only a few seconds per truck.

The current[1/] U.S.H.A. regulations specify a maximum of 90 dBA for continuous 8-hr exposure, with shorter allowable time limits at levels above 90 dBA. No operator must spend a full work day at any location above 90 dBA. Locations above 90 dBA are shown in Table 19.

The time that an individual employee may spend in these locations when the equipment is operating is estimated to be less than the allowable time exposure. Also, at Locations 4.1 and 4.2, the front-end loader is at maximum load only a portion of the total operating time.



Cyclone Separator
Hammermill
Storage Bin
Transformer
Magnetic Belt
Conveyor
Electrical Room
Control Room
Sound Level Measurement Location

Figure 19. Sound survey measurement locations

Table 37. SOUND SURVEY - CITY OF ST. LOUIS REFUSE PROCESSING PLANT

(Plant in operation - January 23, 1974)

Measurement location		Decibels (dB) at center band frequency - Hz and dBA										
No.	Description	31.5	63	125	250	500	1K	2K	4K	8K	16K	dBA
1	Control room	82	82	76	64	65	60	58	56	< 44	< 44	68
2	Shop	85	89	84	80	78	76	73	69	57	50	83
3	Picker control	91	98	88	86	83	81	79	75	70	58	86
4.1	Receiving building	92	106	94	88	88	84	88	84	72	56	94
4.2	Receiving building	100	110	100	96	96	94	90	86	80	74	100
5	Front-end loader	106	100	93	92	87	82	78	78	78	66	89
6	ADS cyclone discharge	93	96	92	88	86	86	86	88	84	72	94
7	Magnetic belt discharge	92	92	92	93	96	100	102	103	98	88	108
8	Fe metal discharge	88	88	86	87	87	86	87	86	82	70	94
9	Hammermill	96	99	98	92	89	88	88	86	80	68	95
10	Nuggetizer	94	94	91	90	93	95	96	93	89	79	101
11	ADS fan exhaust	100	97	93	87	93	89	86	82	75	68	95
12	East drive - ℄ mill	90	92	84	78	76	72	69	65	55	45	80
13	East drive - ℄ storage bin	85	45	80	76	72	71	59	56	57	46	76
14	West drive - ℄ ADS	86	90	94	78	74	78	78	74	69	56	86
15	West drive - ℄ storage bin	90	86	83	80	77	79	79	78	72	58	85
16	South drive - ℄ storage bin	85	85	80	82	75	76	76	72	64	50	82

Table 36. SOUND SURVEY - CITY OF ST. LOUIS REFUSE PROCESSING PLANT
(Background sound - plant not in operation - January 21, 1974)

Measurement location		Decibels (dB) at center band frequency - Hz and dBA										
No.	Description	31.5	63	125	250	500	1K	2K	4K	8K	16K	dBA
1	Control room	51	53	50	< 44	< 44	< 44	< 44	All readings at 4K, 8K and 16K Hz frequency is less than 44 dB at all locations			< 44
2	Shop	60	58	63	55	50	45	< 44				53
3	Packer control	62	64	58	56	53	50	< 44				54
4	Receiving building	62	66	62	57	54	52	46				56
5	Front-end loader a/	64	63	58	49	46	< 44	< 44				47
6	ADS heavies discharge	65	64	67	69	56	54	50				61
7	Magnetic belt discharge	64	66	63	61	53	53	48				59
8	Fe metal discharge	66	66	64	61	55	54	48				59
9	Hammermill	60	71	61	58	51	49	< 44				56
10	Nuggetizer	63	65	66	65	58	54	< 44				59
11	ADS fan exhaust	66	62	62	55	51	49	< 44				55
12	East drive - ℄ mill	62	65	54	55	50	55	< 44				52
13	East drive - ℄ storage bin	60	66	64	58	50	52	45				57
14	West drive - ℄ ADS	62	64	66	60	54	52	47				59
15	West drive - ℄ storage bin	62	66	65	62	54	54	47				56
16	South drive - ℄ storage bin	63	63	63	62	52	54	45				58

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a/ Motor off - loader inside building.

Table 39. LOCATION OF SOUND LEVELS ABOVE 90 dBA AND ALLOWABLE EXPOSURE

Locations	Description	dBA	OSHA allowable time exposure - hr[13/]
4.1	Receiving building	96	4
4.2	Receiving building	100	2
6	ADS heavies discharge	94	4
7	Magnetic belt rejects	108	1/2
8	Fe metal discharge	96	4
9	Hammermill	95	4
10	Nuggetizer	101	1-1/2
11	ADS fan exhaust	95	4

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APPENDIX A

TABULATIONS OF DATA ON PLANT EQUIPMENT, OPERATIONS, AND COSTS

Table A-1. MAJOR ITEMS OF EQUIPMENT - REFUSE PROCESSING FACILITY

Equipment description	Physical parameters: Length (m)	Width (m)	Angle of incline (degrees)	Speed (m/s)	Belt type	Troughing idlers: Degrees	Nominal spacing (m)
Belt conveyors							
Raw refuse receiving^a/	7.3	1.5	0	0.029	Smooth	None	
Raw refuse to hammermill	20.0	1.1	20	1.53	Smooth	35	1.5
Milled refuse to ADS^b/	23.1	1.5	18	1.19	Smooth	35	1.5
Refuse fuel to storage bin^b/	29.9	1.5	18	1.17	Smooth	35	1.5
Storage bin feeding cross belt	8.2	1.5	0	1.02	Smooth	20	0.9
Storage bin discharge	22.2	1.8	0	1.09	Smooth	35	1.0
Load out to packer	30.5	1.2	15	1.10	Smooth	35	1.5
ADS heavies	13.3	0.8	17	1.02	Rough top	20	1.5
Ferrous metal	11.9	0.8	15	0.30	Rough top	20	1.5
Magnetic belt (Indiana General Model SI-A)	1.9	0.8	15	1.78	Solid bar	None	

Vibrating conveyor	Length (m)	Width (m)	Angle of incline (degrees)	Stroke (m)	CPM	Model
Hammermill feeder	1.9	2.1	0	0.035	555	Stephens Adamson natural frequency conveyor
Hammermill discharge	5.9	2.1	0	0.035	520	Stephens Adamson natural frequency conveyor
ADS feeder^c/	3.0	2.1	0	--	900	FMC straight line vibrator No. [illegible]

Other conveyors	Speed	Model
ADS drag conveyor	0.31 m/s	Rader Pneumatic's 1.3 m wide fed from 2.4 m x 1.7 m hopper
ADS drag conveyor scalping roll	87 rpm	2.1 m wide by 0.3 m diameter

Major equipment	Shaft speed (rpm)	Model
Hammermill	895	Gruendler 18.1 m x 21.6 m with 76.2 mm square grates
ADS fan	1,170	New York Blower size [illegible]; Design 22.7 m³/s, 100 kW, at 1.5 kPa and 1,1[illegible] rpm
[illegible]	115	[illegible] model 1000
Magnetic drum	33	Eriez magnetic drum with permanent magnetics; 1.10 m wide, 0.66 m diameter

Bins	Material height (m)	Length (m)	Width (m)	Capacity (m³)
Storage bin	10.7	18.3	2.7 top 1.8 bottom	332
Packer bin	6.0	1.5	1.8	17

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a/ Raw refuse receiving conveyor variable speed 0 to 1.12 m/s maximum (0.029 m/s normal).
b/ Both conveyors driven by one 7.5 kW motor.
c/ Feeder has round hole flat metal perforated screen 0.6 m long to remove fine particles from feed to ADS.

Table A-7. MAJOR MOTORS - REFUSE PROCESSING FACILITY

Equipment served	HP	kW^a/	RPM	Amperage: Name Plate	Amperage: Actual	Amperage: % of Name Plate
3 Phase 4,160 V motors						
Hammermill	1,250	932.5	895	155	50-300	32-194
3 Phase 460 V motors						
Raw refuse receiving belt conveyor	5	3.7	1,730	6	0.5	8
Raw refuse belt conveyor to hammermill	15	11.2	1,755	19.5	10.0	51
Hammermill feeder vibrating conveyor	20	14.9	1,200	27	11	41
Hammermill dust collection fan	7.5	5.6	1,710	10	6.5	65
Hammermill discharge vibrating conveyor	18.7	18.7	1,200	33	16	47
Milled refuse belt conveyor	10	7.5	1,735	13.1	8.1	62
ADS drag conveyor	15	11.2	1,750	19.2	10.8	56
ADS drag conveyor scalper roll	3	2.2	1,750	4.5	1.5	33
ADS feeder vibrating conveyor	10	7.5	1,750	12.9	6.2	48
ADS feed rotary airlock	25	18.7	1,750	34	11	32
ADS cyclone discharge rotary airlock	25	18.7	1,760	30.5	13	43
ADS fan	200	149.2	1,780	230	140-220	61-96
Storage bin feeding cross belt conveyor	5	3.7	1,730	7	3.5	[illegible]
Storage bin discharge screw conveyor	150	111.9	1,780	185	25-130	13-70
Storage bin discharge belt conveyor	10	7.5	1,755	13.5	6.0	44
Load out belt conveyor to market	7.5	5.6	1,760	10	5.0	50
Packer hydraulic unit	60	44.8	1,750	69	18	26
ADS heavies belt conveyor	3	2.2	1,755	5.2	3.1	60
Magnetic separator belt	5	3.7	1,745	6.9	6.0	87
Aspectizer	100	74.6	1,780	117	20-100	17-86
Magnetic drum	1	0.7	1,750	1.9	1.7	89
Aspectizer dust collection fan	7.5	5.6	1,750	10.3	5.9	57
Ferrous metal belt conveyor	3	2.2	1,755	4.6	2.6	57
Air compressor	3	2.2	1,735	4.6	4.0	87
Storage bin cross belt carriage drive	[illegible]	[illegible]	1,750	1	not used	
1 Phase 208 V motor						
Fire protection tank air compressor	1.5	1.1	1,740	5.5	4.8	87
Direct current 180 V motor						
Storage bin discharge screw conveyor carriage drive (variable speed; max 1,750 RPM)	[illegible]	0.6	1,750	5	1.2	24
Power supplies: 1 phase 460 V						
Magnetic belt power supply		10	--	15	8	53
Total connected kW		1,678.2				

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a/ SI units = 0.746 kW/hp
ASTM standard E 380-76, Metric Practice Guide

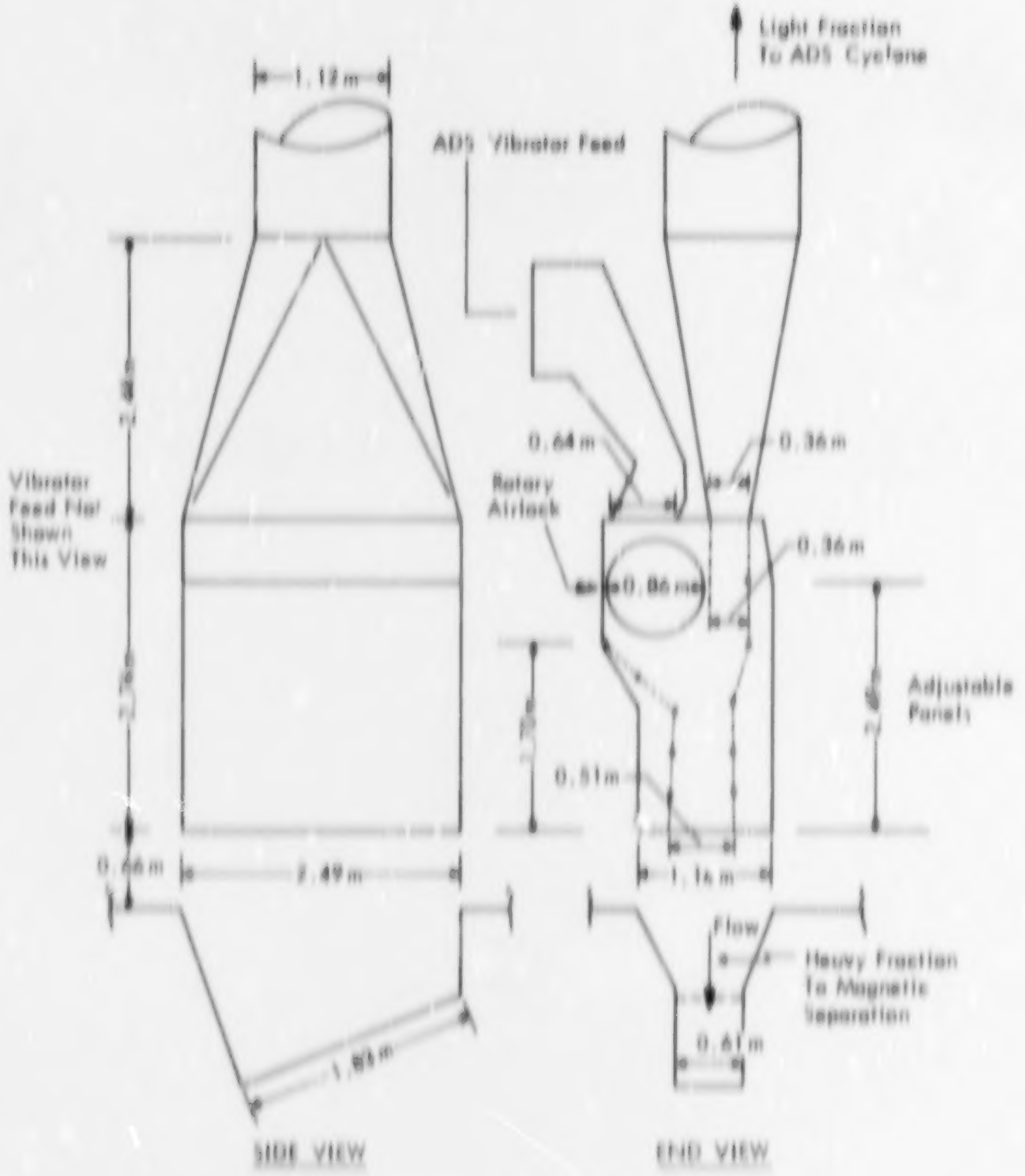
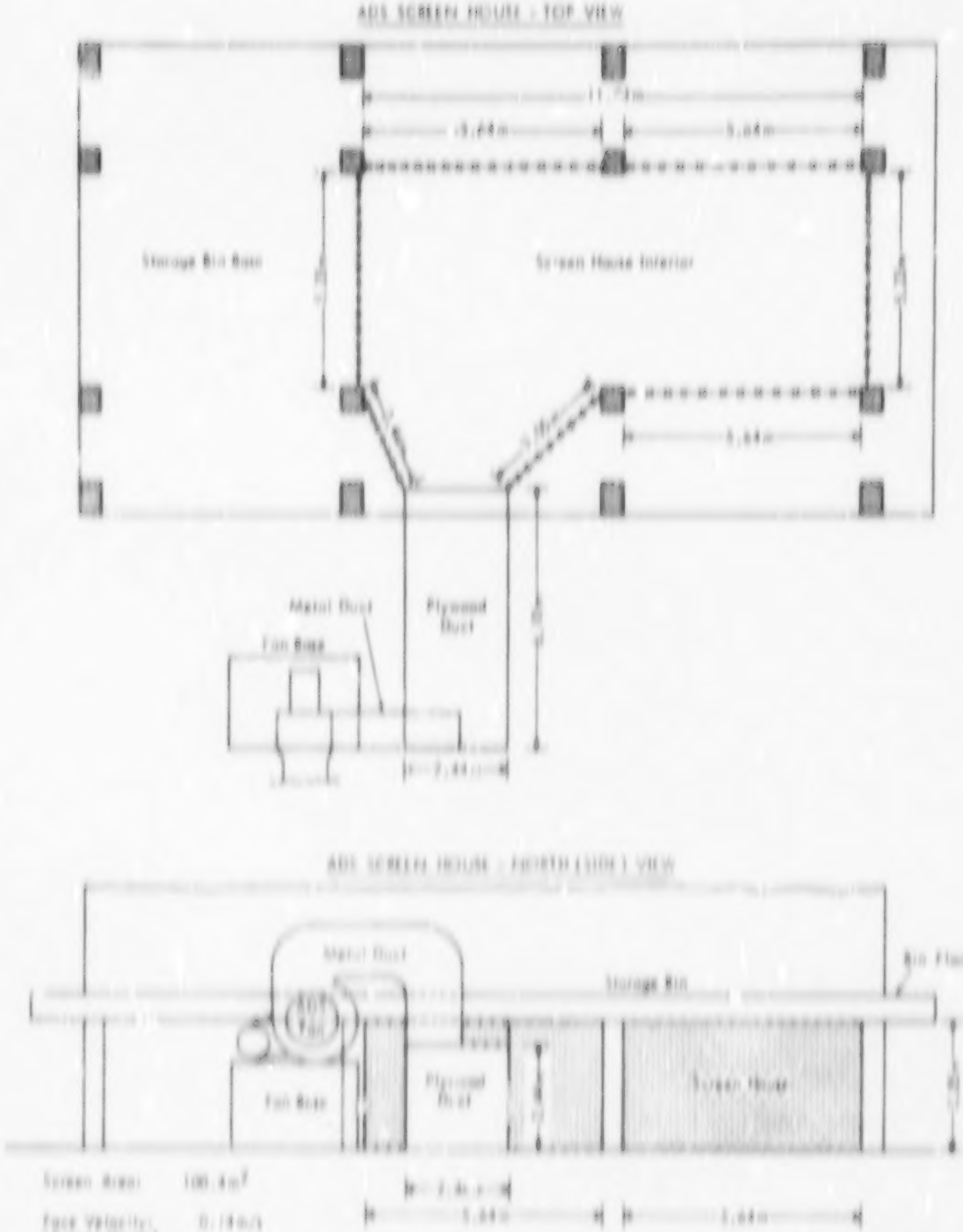

Light Fraction
To ADS Cyclone
1.12 m
ADS Vibrator Feed
Vibrator
Feed Not
Shown
This View
0.64 m
0.36 m
Rotary
Airlock
0.36 m
0.86 m
Adjustable
Panels
0.51 m
0.66 m
2.49 m
1.14 m
Flow
Heavy Fraction
To Magnetic
Separation
1.83 m
0.61 m
SIDE VIEW
END VIEW

Figure A-1. Configuration of ADS separation chamber


ADS SCREEN HOUSE : TOP VIEW
11.73m
5.64m
5.64m
Storage Bin Room
Screen House Interior
5.64m
Metal Duct
Plywood Duct
Fan Room
2.44m
ADS SCREEN HOUSE : NORTH (SIDE) VIEW
Metal Duct
Storage Bin
Bin Floor
ADS Fan
Fan Room
Plywood Duct
Screen House
2.44m
5.64m
5.64m

Screen Area: 100.4m²

Face Velocity: 0.19m/s
(Screen House)

Face Velocity: 2.38m/s
(Plywood Duct)

Screen Description: Plastic, 472 mesh/meter, 1.6mm sq. openings

Figure A-7. Dimensions of ADS screen house

TABLE [illegible]. VEHICLE SPECIFICATIONS - [illegible] PROCESSING FACILITY

Manufacturer	Model	Vehicle No.	Description	Capacity	Engine Type	Engine Displacement (ℓ)	Cylinders	Net kW[a]	Net hp
International Harvester	[illegible]	[illegible]	Pick-up	[illegible] kg	Gasoline	[illegible]	6	[illegible]	[illegible]
International Harvester	[illegible]	[illegible]	Dump truck	[illegible] m^3 ([illegible] yd^3)	Gasoline	[illegible]	8	[illegible]	[illegible]
International Harvester	[illegible]	[illegible]	Dump truck	[illegible] m^3 ([illegible] yd^3)	Gasoline	[illegible]	8	[illegible]	[illegible]
International Harvester	[illegible]	[illegible]	Dump truck	[illegible] m^3 ([illegible] yd^3)	Gasoline	[illegible]	8	[illegible]	[illegible]
Case	[illegible]	[illegible]	Front-end loader	[illegible] m^3 ([illegible] yd^3)	Diesel	[illegible]	4	[illegible]	[illegible]
International Harvester	[illegible]	[illegible]	Front-end loader	[illegible] m^3 ([illegible] yd^3)	Diesel	[illegible]	6	[illegible]	[illegible]
International Harvester [illegible] Compactor Trailer	[illegible]	[illegible]	Packer truck	[illegible] m^3 ([illegible] yd^3)	Diesel	[illegible]	6	[illegible]	[illegible]
International Harvester [illegible] Compactor Trailer	[illegible]	[illegible]	Packer truck	[illegible] m^3 ([illegible] yd^3)	Diesel	[illegible]	6	[illegible]	[illegible]
International Harvester [illegible] Compactor Trailer	[illegible]	[illegible]	Packer truck	[illegible] m^3 ([illegible] yd^3)	Diesel	[illegible]	6	[illegible]	[illegible]

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[a] [illegible]
ASTM standard E 380-76: Metric Practice Guide

Table A-5. MAJOR ITEMS OF EQUIPMENT - RECEIVING FACILITY

Equipment description	
Belt conveyor (RDF from receiving hopper to airlock)	Length: 10.5 m Width: 1.2 m m/s: 1.1 Belt type: smooth Angle of incline: Flat Troughing idlers: 20 degrees, 0.99-m spacing
Airlock feeding pneumatic conveyor	Diameter: 2.74 m Width: 1.49 m
Blower for pneumatic conveying	Sutorbilt model 12 x 36 - 3100 RPM: 885 Airflow: 1.36 actual m^3/s at 21 kPa
Pneumatic conveying line	Mild steel Diameter: 0.305 m
Receiving hopper	Width: 3.22 m Length: 6.17 m Height: 3.66 m Capacity: 95 m^3

Table 4-5. MAJOR MOTORS - RECEIVING FACILITY

				Amperage		
Equipment served	hp	kW[a]	rpm	Name plate	Actual	% of Name plate
3 Phase 460 V motors						
Receiving hopper discharge screw conveyor	75	56.0	1,775	92	40.0	43
Belt conveyor	5	3.7	1,740	6.5	5.2	80
Rotary airlock feeder for pneumatic line	15	11.2	1,765	20	11.5	58
Blower for pneumatic conveyor line[b]	100	74.6	1,770	116	100-120	86-103
Direct current 230 V motor						
Receiving hopper discharge screw conveyor carriage drive (variable speed, maximum 1,780 RPM)	0.5	0.4	1,780	3.8	3.8	100
Total connected kW		145.9				

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[a] S.I. units - 0.746 kW/hp
ASTM standard E 380-76: Metric Practice Guide

[b] Amperage and blower pressure fluctuates; 120 amp at 21 kPa blower outlet pressure.

Table [illegible] (Concluded)

	Oct. 1976	Nov. 1976	Dec. 1976	Jan. 1977	Feb. 1977	March 1977	April 1977	May 1977	June 1977	July 1977	Aug. 1977	Sept. 1977	Total
Capital cost[a]													
[illegible][b]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fixed investment[c]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total capital cost	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total cost of operation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Value of recovered [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Net cost of operation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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[a] [illegible]

[b] [illegible]

[c] Capital recovery, [illegible] years, [illegible]

[d] Capital recovery [illegible] years, [illegible]

Table A-8 CAPITAL EXPENDITURES-REFUSE PROCESSING FACILITY

The capital expenditures for the project are summarized as follows:

Processing plant

Equipment:

Hammermill and motor	$ 92,850
Vibratory conveyors	66,729
Belt conveyors	110,661
Storage bin and unloader	76,560
Belt scales	12,320
Shuttle belt conveyor	7,850
Magnetic separator	30,980
Stationary packer	26,295
Power transformer	16,726
Air density separator system	116,986
Metal densification unit	50,630
Air compressor, vent fan and motor	1,891
Permanent magnet drum	2,620
Miscellaneous equipment (office, testing, shop, communication)	11,176
Total equipment	$ 555,780

Construction:

Excavation, grading and offsite borrow	$ 66,160
Piling	85,575
Concrete	151,611
Structural steel	108,715
Prefabricated building	77,380
Interior enclosures	12,205
Bin superstructure, canopies and platforms	68,999
HVAC	16,697
Piping	6,600
Sprinkler system	17,760
Ventilation	12,310
Installation of equipment	122,393
Electrical	276,159
Painting	[illegible]
Asphaltic concrete	16,639
Total construction	$1,015,481
Engineering	181,300
Total capital cost processing plant (not including rolling stock)	$1,752,615

Receiving facility

Equipment:

Receiving bin unloader	$ 26,860
Belt conveyor	9,063
Pneumatic transfer system	23,865
Total equipment	$ 60,486

Table A-8. (Concluded)

The capital expenditures for the project are summarized as follows:

Receiving facility	
Construction:	
Excavation and grading	$ 68,185
Piling	26,000
Concrete	64,715
Structure steel	6,945
Building and superstructure	16,931
Receiving bin	11,815
Sewer	5,000
Piping	1,600
Ventilation	2,200
Installation of equipment	11,745
Electrical	56,573
Painting	2,550
Total construction	$ 272,259
Engineering	34,800
Total capital cost receiving facility	$ 307,963
Rolling stock	
Processing plant:	
Two front-end loaders, three dump trucks, one pick-up truck, one automobile	$ 76,899
Receiving facility:	
Three tractor-trailer trucks	74,287
Total capital cost rolling stock	$ 151,186
Plant start-up expense	
Processing plant	$ 8,122
Summary	
Total processing plant	$1,752,515
Total receiving facility	307,963
Total rolling stock	151,186
Total plant startup	8,122
Total capital costs refuse processing facility	$2,219,786

[illegible]

Table 8-5. (Continued)

Week of production	Date 1974 Month	Day	Weather	Test no.	Raw refuse processed Mg/day	Mg/h	Comments
Week 12							
Monday	12	23		-	0	0	Waiting for replacement drag chain from manufacture
Tuesday	12	24		-	0	0	Waiting for replacement drag chain from manufacture
Wednesday	12	25		-	-	-	Holiday - Christmas
Thursday	12	26		-	0	0	ADS drag chain replaced by end of day
Friday	12	27	Cloudy	-	110.8	20.1	Sugar cane test a.m. Refuse processed p.m. No samples taken
Average					110.8	20.1	
Week 13							
Monday	12	30	Cloudy	37	197.7	29.3	
Tuesday	12	31	Rain	38	209.1	31.6	
Wednesday (1975)	1	1		-	-	-	Holiday - New Years
Thursday	1	2	Cloudy	39	230.4	31.6	
Friday	1	3	Cloudy	40	106.2	33.2	
Average					178.2	32.0	
Week 14							
Monday	1	6	Cloudy	41	191.1	33.0	
Tuesday	1	7	Cloudy	42	136.5	23.3	Hammermill shutdown--sheared bolts on breaker bar
Wednesday	1	8	Rain	43	128.5	33.1	Hammermill shutdown--sheared bolts on breaker bar
Thursday	1	9	Clear	44	148.1	31.6	Hammermill shutdown--sheared bolts on breaker bar
Friday	1	10		-	0	0	Storage bin full--ADS: Running at slow rate
Average					151.1	31.5	
Week 15							
Monday	1	13	Clear	45	119.8	21.1	Frozen pneumatic control line on ADS fan
Tuesday	1	14	Cloudy	46	196.6	27.1	
Wednesday	1	15		-	-	-	Holiday - Martin Luther King day
Thursday	1	16		-	0	0	Turned ADS exhaust to plenum area under storage bin
Friday	1	17	Cloudy	47	135.1	18.5	
Average					151.6	22.2	
Week 16							
Monday	1	20	Clear	48	91.1	33.0	
Tuesday	1	21	Clear	49	136.8	30.3	Reliance Electric Company performed hammermill motor test
Wednesday	1	22	Cloudy	50	133.6	25.3	
Thursday	1	23	Cloudy	51	150.8	29.0	
Friday	1	24	Cloudy	52	137.3	28.8	
Average					126.4	29.1	
Week 17							
Monday	1	27	Cloudy	53	125.0	30.0	
Tuesday	1	28	Cloudy	54	112.1	28.0	
Wednesday	1	29	Clear	55	209.8	33.6	Hammermill shutdown to balance rotor
Thursday	1	30		-	0	0	Storage bin full--ADS: Running at slow rate
Friday	1	31	Rain	56	216.8	33.2	
Average					165.9	31.2	
Week 18							
Monday	2	3	Cloudy	57	253.3	42.3	
Tuesday	2	4	Rain	58	175.3	23.3	
Wednesday	2	5		-	0	0	Storage bin full--ADS: Running at slow rate
Thursday	2	6	Cloudy	59	108.3	26.6	
Friday	2	7	Clear	60	118.3	33.3	
Average					163.7	31.6	

Table 5-5. (Continued)

Day of production	Date (86) Month	Date (86) Day	Weather	Temp. deg.	Raw refuse processed Mg/day	Raw refuse processed Mg/h	Comments
Week 10							
Monday	2	10	Clear	61	80.1	31.1	Hammermill motor starter malfunction; corrected by end of day
Tuesday	2	11	Cloudy	61	75.5	33.1	
Wednesday	2	12		-	-	-	Holiday - Lincoln's birthday
Thursday	2	13	Cloudy	63	103.9	35.0	
Friday	2	14	Rain	61	98.0	33.0	
Average					95.1	30.8	
Week 11							
Monday	2	17		-	-	-	Holiday - Washington's birthday
Tuesday	2	18	Cloudy	55	151.8	53.6	All processed material collected for 2/18
Wednesday	2	19	Clear	58	151.8	30.5	Double grind test; reground refuse from 2/18
Thursday	2	20	Clear	61	85.9	26.8	
Friday	2	21		-	0	0	U.S. maintenance outage—malfunction of Atlas bin hydraulic system
Average					130.8	37.7	
No production this week							
Monday	2	24		-	0	0	U.S. maintenance outage—Atlas bin hydraulic system
Tuesday	2	25		-	0	0	U.S. maintenance outage—Atlas bin hydraulic system
Wednesday	2	26		-	0	0	U.S. maintenance outage—Atlas bin hydraulic system
Thursday	2	27		-	0	0	U.S. maintenance outage—Atlas bin hydraulic system
Friday	2	28		-	0	0	U.S. maintenance outage—Atlas bin hydraulic system
Average					0	0	
Week 12							
Monday	3	3	Clear	58	132.7	35.3	
Tuesday	3	4	Clear	69	121.6	31.1	
Wednesday	3	5	Cloudy	75	95.3	29.0	
Thursday	3	6		-	0	0	U.S. general maintenance outage
Friday	3	7	Cloudy	71	161.1	22.1	
Average					127.7	29.4	
Week 13							
Monday	3	10	Cloudy	71	118.1	35.3	Hammermill shut down for maintenance
Tuesday	3	11	Cloudy	73	130.3	35.5	
Wednesday	3	12		-	0	0	U.S. general maintenance outage
Thursday	3	13	Cloudy	75	140.1	33.7	
Friday	3	14	Clear	75	128.3	30.1	
Average					129.2	33.6	
Week 14							
Monday	3	17		-	0	0	General maintenance outage in preparation for environmental tests at U.S.
Tuesday	3	18		-	0	0	General maintenance outage in preparation for environmental tests at U.S.
Wednesday	3	19		-	0	0	General maintenance outage in preparation for environmental tests at U.S.
Thursday	3	20	Clear	76	132.6	33.3	
Friday	3	21		-	0	0	General maintenance outage in preparation for environmental tests at U.S.
Average					132.6	33.3	

Table A-9. (Continued)

Week of production	Date 1975 Month	Day	Weather	Test day	Raw refuse processed Mg/day	Mg/hr	Comments
Week 24							
Monday	3	24	Clear	77	227.6	30.3	Start of coal and refuse burn on U.E. 5
Tuesday	3	25	Cloudy	78	130.7	28.4	
Wednesday	3	26	Clear	79	175.5	30.3	
Thursday	3	27	Rain	80	216.6	42.5	
Friday	3	28	Rain	81	188.3	36.1	
Saturday	3	29	Clear	82	95.0	33.0	
Average					206.1	33.6	
Week 25							
Monday	3	31	Clear	83	302.3	36.5	U.E. commenced environmental testing at power plant
Tuesday	4	1	Clear	84	298.6	40.7	
Wednesday	4	2	Cloudy	85	438.6	36.7	
Thursday	4	3	Clear	86	156.3	27.9	
Friday	4	4	Clear	87	161.3	31.8	Bearing failure on ADS drag chain
Saturday	4	5	Clear	*	122.3	25.8	* Material processed on Saturday would have been processed on Friday had bearing failure not occurred. Samples collected included in composite for Friday
Average					250.1	35.7	
Week 26							
Monday	4	7	Clear	88	269.3	31.9	
Tuesday	4	8	Rain	89	287.0	36.2	
Wednesday	4	9	Cloudy	90	91.2	33.7	
Thursday	4	10	Clear	91	132.4	29.4	
Friday	4	11	Clear	92	118.3	37.1	
Saturday	4	12	Clear	93	233.0	32.1	
Average					272.2	35.7	
Week 27							
Monday	4	14	Clear	94	141.7	25.3	
Tuesday	4	15	Clear	95	173.8	41.8	
Wednesday	4	16	Clear	96	203.3	25.7	
Thursday	4	17		-	0	0	Repaired holes in ADS cyclone separator
Friday	4	18	Cloudy	97	107.5	20.8	Fine grind 1-1/4 in. diameter opening grates$^{a/}$ in hammermill
Saturday	4	19	Clear	98	188.7	32.3	Fine grind 1-1/4 in. diameter opening grates$^{a/}$ in hammermill
Average					179.2	29.1	
Week 28							
Monday	4	21	Clear	99	162.7	20.9	Fine grind 1-1/4 in. diameter opening grates$^{a/}$ in hammermill
Tuesday	4	22	Clear	100	174.5	23.2	Fine grind 1-1/4 in. diameter opening grates$^{a/}$ in hammermill
Wednesday	4	23	Rain	101	224.8	17.0	Fine grind 1-1/4 in. diameter opening grates$^{a/}$ in hammermill
Thursday	4	24		-	0	0	U.E. maintenance outage: broken boiler tube
Friday	4	25		-	0	0	U.E. maintenance outage: broken boiler tube
Saturday	4	26		-	0	0	U.E. burning balance of accumulated fine grind refuse fuel; last day of U.E. conducted environmental tests
Average					187.3	21.1	

Table 4-9. (Continued)

Week of production	Date 1975 Month	Date 1975 Day	Weather	Test No.	Raw refuse processed Mg/day	Raw refuse processed Mg/hr	Comments
Week 29							
Monday	4	28	Clear	102	161.7	27.9	Normal 7-in. square opening grates in hammermill
Tuesday	4	29	Clear	103	136.6	31.3	
Wednesday	4	30	Rain	104	171.8	33.7	Start of environmental tests at U.E.
Thursday	5	1	Cloudy	105	116.0	22.1	
Friday	5	2	Cloudy	106	227.1	28.1	
Average					158.8	28.6	
Week 30							
Monday	5	5		-	0	0	U.E. maintenance outage--broken boiler tube
Tuesday	5	6		-	0	0	U.E. maintenance outage--broken boiler tube
Wednesday	5	7		-	0	0	U.E. maintenance outage--broken boiler tube
Thursday	5	8		-	-	-	Holiday - Truman's Birthday
Friday	5	9		107	79.8	32.2	Demonstration run for tour group
Average					79.8	32.2	
Week 31							
Monday	5	12	Cloudy	108	211.1	37.8	Nuggetizer shutdown at 1:00 p.m. Rotor jammed
Tuesday	5	13	Cloudy	109	173.3	41.3	Nuggetizer not operated. Rotor jammed
Wednesday	5	14		-	0	0	Repair of failed bearings on receiving building screw conveyor at power plant
Thursday	5	15		-	0	0	Repair of failed bearings on receiving building screw conveyor at power plant
Friday	5	16	Clear	110	220.1	34.8	
Average					201.7	38.1	
Week 32							
Monday	5	19	Clear	111	151.6	26.2	
Tuesday	5	20	Cloudy	112	121.8	30.1	Lead wire on hammermill motor came loose at 1:00 p.m. burning out lighting arrester and oxidizing first 10 ft of lead wire
Wednesday	5	21		-	0	0	Waiting for spare parts - hammermill electrical connection
Thursday	5	22		-	0	0	Waiting for spare parts - hammermill electrical connection
Friday	5	23		-	0	0	Waiting for spare parts - hammermill electrical connection
Average					136.7	27.8	
No production this week							
Monday	5	26		-	-	-	Holiday - Memorial Day
Tuesday	5	27		-	0	0	Waiting for spare parts - hammermill electrical connection
Wednesday	5	28		-	0	0	Waiting for spare parts - hammermill electrical connection
Thursday	5	29		-	0	0	Waiting for spare parts - hammermill electrical connection
Friday	5	30		-	0	0	Waiting for spare parts - hammermill electrical connection
Average					0	0	

Table A-9. (Continued)

Week of production	Date 1975 Month	Day	Weather	Test day	Raw refuse processed Mg/day	Mg/hr	Comments
No production this week							
Monday	6	2		-	0	0	Waiting for spare parts - hammermill electrical connection
Tuesday	6	3		-	0	0	Waiting for spare parts - hammermill electrical connection
Wednesday	6	4		-	0	0	Aluminum cord wire and lighting arrester received. Electrician started hammermill electrical repair
Thursday	6	5		-	0	0	Hammermill electrical repair
Friday	6	6		-	0	0	Hammermill electrical repair
Average					0	0	
Week 33							
Monday	6	9		-	0	0	Hammermill electrical repair finished
Tuesday	6	10		-	0	0a/	Replaced broken chain link on ADS drag chain conveyor
Wednesday	6	11	Clear	-	39.1	19.0b/	Demonstration run for tour group; no samples taken
Thursday	6	12	Clear	-	17.3	11.0b/	Run to produce ADS heavies for U.S. test; no samples taken
Friday	6	13		-	0	0a/	
Average					11.3	15.0	
Week 34							
Monday	6	16		-	0	0	b/
Tuesday	6	17		-	0	0	b/
Wednesday	6	18		-	0	0	b/
Thursday	6	19		-	0	0	b/ Hauled refuse fuel from bin and bin to U.S.
Friday	6	20		-	81.1	16.3	c/ Run to produce ADS heavies for U.S. test; no samples taken
Average					81.1	16.3	
Week 35							
Monday	6	23		-	0	0	Electrical power off to repair electric power distribution substation
Tuesday	6	24		-	0	0	Electrical power off to repair electric power distribution substation
Wednesday	6	25		-	0	0	Electrical power off to repair electric power distribution substation
Thursday	6	26		-	0	0	Electrical power off to repair electric power distribution substation
Friday	6	27		-	98.9	16.2	c/ Produced ADS heavies for U.S. test; no samples taken
Average					98.9	16.2	
Week 36							
Monday	6	30	Clear	113	68.0	18.1	Environmental tests at processing plant
Tuesday	7	1	Clear	114	128.6	19.8	Environmental tests at processing plant
Wednesday	7	2	Clear	115	100.7	23.7	Environmental tests at processing plant
Thursday	7	3	Clear	116	155.6	19.9	Environmental tests at processing plant
Friday	7	4			0	0	Holiday - Independence Day
Average					113.2	20.3	(All RDF landfilled during week 36 due to maintenance outage at power plant)
Week 37							
Monday	7	7	Clear	117	127.4	19.1	
Tuesday	7	8	Clear	118	86.5	18.7	
Wednesday	7	9	Clear	119	167.6	17.8	
Thursday	7	10	Clear	120	118.5	21.1	
Friday	7	11	Clear	121	190.6	21.8	
Average					138.1	19.7	

Table [illegible] (Concluded)

Week of production	Date 1975 Month	Day	Weather	Test no.	[illegible]	[illegible]	Remarks
Week [illegible]							
Monday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Tuesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Wednesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Thursday	[illegible]	[illegible]	Cloudy	[illegible]	[illegible]	[illegible]	[illegible]
Friday	[illegible]	[illegible]	Cloudy	[illegible]	[illegible]	[illegible]	[illegible]
Average					[illegible]	[illegible]	
Week [illegible]							
Monday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Tuesday	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wednesday	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Thursday	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Friday	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average					[illegible]	[illegible]	
No production this week							
Monday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Tuesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Wednesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Thursday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Friday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Average					[illegible]	[illegible]	
No production this week							
Monday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Tuesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Wednesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Thursday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Friday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Average					[illegible]	[illegible]	
No production this week							
Monday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Tuesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Wednesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Thursday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Friday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Average					[illegible]	[illegible]	
No production this week							
Monday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Tuesday	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Average					[illegible]	[illegible]	
Total average for [illegible] weeks of production					[illegible]	[illegible]	[illegible]
Maximum value					[illegible]	[illegible]	
Minimum value					[illegible]	[illegible]	

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a [illegible]

b [illegible]

c [illegible]

d [illegible]

Table 4-35. WEEKLY SUMMARY OF PLANT DOWNTIME DURING PROCESSING DAYS

[illegible] Month	[illegible] Day	[illegible]	Equipment	Description
[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]		[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]
		[illegible]	Total	

Table A-11. (Continued)

Week of 1971 Month	Day	Downtime Hours	Equipment	Description
[illegible]	[illegible]	[illegible]	Truck	Tire change
[illegible]	[illegible]	[illegible]	ADS	ADS flight caught in loader air line
[illegible]	[illegible]	[illegible]	Hammermill feed conv.	Electrical circuit failure
[illegible]	[illegible]	[illegible]	Processing plant	General maintenance
		[illegible]	Total	
Week of 1972 **Month**	**Day**			
[illegible]	[illegible]	[illegible]	Truck	Change mag. belt reject truck
		[illegible]	Processing plant	General maintenance
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	Classifier cyclone	Pneumatic lines frozen
		[illegible]	ADS	Surge bin plugged
		[illegible]	Storage bin	Overfilled
		[illegible]	ADS	Surge bin paddle wheel malfunction
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	Hammermill	Low lubrication pressure
[illegible]	[illegible]	[illegible]	Vibrating conv.	Check conveyor vibration
[illegible]	[illegible]	[illegible]	Hammermill feed conv.	Jammed belt
		[illegible]	Hammermill feed conv.	Fuse blown
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	Hammermill	[illegible]
		[illegible]	Truck	Change mag. belt reject truck
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	Conveyor belt	Malfunction of ADS because conveyor belt
		[illegible]	Total	

Table A-[illegible]. (Continued)

Date of Fail. Month	Date of Fail. Day	Downtime Hours	Equipment	Description
[illegible]	[illegible]	[illegible]	Hammermill feed conv.	Belt jammed due to overload
		[illegible]	Conveyor belt	[illegible]
		[illegible]	ADS	[illegible]
		[illegible]	ADS	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	ADS	Clean fan
		[illegible]	Hammermill	[illegible]
		[illegible]	ADS	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	ADS	[illegible]
		[illegible]	Magnetic belt	[illegible]
		[illegible]	Trash	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	ADS	[illegible]
		[illegible]	ADS	Clean ADS fan
		[illegible]	Hammermill	[illegible] on discharge vibrating conveyor
		[illegible]	ADS	Clean ADS fan
		[illegible]	Hammermill	[illegible] on discharge vibrating conveyor
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	ADS	Clean ADS fan
[illegible]	[illegible]	[illegible]	ADS	Clean ADS fan
		[illegible]	Hammermill	Safety circuit tripped due to high bearing temp.
		[illegible]	Magnetic belt	[illegible]
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	ADS	Drag chain bearing failure
		[illegible]	Total	
[illegible]	[illegible]	[illegible]	ADS	[illegible]
		[illegible]	Hammermill	Safety circuit tripped due to high bearing temp.
		[illegible]	Hammermill	[illegible]
		[illegible]	Total	

Table 4-35. (Concluded)

Week of 1971 Month	Day	Downtime (hours)	Equipment	Description
6	30	[illegible]	Hammermill	Refuse overload
7	7	[illegible]		Shortage of labor necessitated shutdown for lunch
7	14	[illegible]	ADS	Vibrating conveyor off feed, replacing roll application
7	28	[illegible]	ADS	Defective surge bin relay
		[illegible]	—	Shortage of labor necessitated shutdown for lunch
		[illegible]	Total	
8	[illegible]	[illegible]	ADS	Clean ADS bin
		[illegible]	—	Shortage of labor necessitated shutdown for lunch
		[illegible]	ADS	Drag chain flight broke and jammed against side of surge bin
		[illegible]	Total	
8	[illegible]	[illegible]	Hammermill	Repair seal
		[illegible]	ADS	Repair drag chain in surge bin
		[illegible]	Truck	Clear truck overfilled
		[illegible]	Total	

Table A-11. WEEKLY SUMMARY OF MAJOR PLANT MAINTENANCE NOT COUNTED AS DOWNTIME

Week of 1976			
Month	Day	Equipment	Description
9	23	Hammermill	Hammer retipping, replacement of 10 hammers
		Stationary packer	Welded plate on packer
		ADS	Clean fan
		Nuggetizer	Clean fan, turn wear plate around, inspection
		Magnetic belt	Misaligned and jammed, realigned and reject hopper cleared
9	30	Hammermill	Hammer retipping
10	7	Hammermill	Hammer retipping, replacement of 11 hammers
10	14	Hammermill	Hammer retipping, hammer replacement
		Magnetic drum	Repair hole in feed chute
10	21	Hammermill	Fire in refuse collected behind discharge, hammer retipping
10	28	Hammermill	Replace oil lines; change oil
		Hammermill feed conv.	Replace belt; replace seal
		Nuggetizer	Lubricate; tighten bolts; clean fan
		Conveyor belts	Clean
		Storage bin	Install new tips on auger
		Magnetic belt	Lubricate
		ADS	Clean fan
11	4	Hammermill	Hammer retipping; change air filter on oil cooler
		ADS	Clean, parts fabrication
		Storage bin	Lubricate auger machinery
		Nuggetizer	Lubricate; clean fan; tighten bolts
		Union Electric	Replace crescent coupling; feeder inspection
		Recycling facility	General maintenance
		Payloader	Maintenance and motor repair
11	11	Hammermill	Drain water from oil cooler; hammer retipping
		Hammermill feed conv.	Adjustments
		ADS	Clean fan; replace inspection door seals
		Nuggetizer	Tighten bolts; clean fan
		Storage bin	Clean auger traversing tracks
		Conveyor belts	Replace seals
11	18	Hammermill	Fire in refuse collected behind discharge, hammer retipping
		ADS	Clean fan; clean pneumatic control system
		Nuggetizer	Replace anchor bolt; lubricate
		Conveyor belts	Replace coverings
		Surge bin	Remove plastic lining
		Packer truck	Repair broken oil lines
11	25	Hammermill	Hammer retipping
		Hammermill feed conv.	Bolt tightening on vibrator; seal fabrication
		ADS	Air compressor maintenance (pneumatic control system); repair scalping roll in surge bin; fan bearing replacement
		Stationary packer	Change oil; repair hose rip
		Nuggetizer	Repair inspection door

Table A-11. (Continued)

Week of 1976 Month	Day	Equipment	Description
12	2	Hammermill	Oil pump failure; retipping, new baffles
		ADS	Clean fan
		Ruggerizer	Tighten, grease, and clean fans
		US receiving facility	Fire in Atlas bin due to bearing failure on bin sweep
		Drive belts	Hammermill receiving vibrating conv.; repair bushing in drive sheave
12	9	ADS	ADS flight chain broke; waiting for replacement
		Hammermill	Retipping, new curtain
		Magnetic belt	Repair belt, install ribs on magnetic belts
		Hammermill feed conveyors	Clear jam and new seal
		Drive belts	Tighten
		ADS vibrating feeder	Clear material jam
12	16	Hammermill	Retipping
		ADS	Repair flights; scalping roll
		Magnetic belt conv.	Repair reducer
		Storage bin	Repair screw conveyor; change lugs
12	23	ADS	ADS drag chain replaced
		Hammermill	Retipping
12	30	Hammermill	Retipping

Week of 1977 Month	Day	Equipment	Description
1	6	Ruggerizer	Vibrations sheared bolts on breaker bar; tighten and grease; clean fans
		ADS	Clear jam; weld flights; clean pneumatic fan
		US receiving facility	Maintenance outage
1	13	ADS	Airflow control circuit malfunction; frozen pneumatic lines; alter blower configuration of ADS
		Ruggerizer	Excessive vibrations
		Hammermill	Retipping
1	20	Hammermill	Hammermill performance tests; retipping
		Ruggerizer	Excessive vibrations; tighten bolts and grease; clean fans
		ADS	Change flaps on feeder; weld air separator elbow; clean fan
		Storage bin	Tighten set screws on auger chain drive
		Conveyor belts	Clean rollers on ADS heavies belt conveyor
1	27	Hammermill	Retipping; repair seal
		Ruggerizer	Bolts holding circular rotator mechanism sheared

Table A-11. (Continued)

Week of 1977 Month	Day	Equipment	Description
2	3	Hammermill	Retipping
		ADS	Clean fan; repair air compressor
		Nuggetizer	Clean fans; tighten bolts and grease
2	10	Hammermill	Retipping
		ADS	Clean fan; repair bin level indicator
		Nuggetizer	Tighten hammers and bolts; clean fans
2	17	IR receiving facility	Atlas bin hydraulic system outage
		Hammermill	Retipping; oil
		ADS	Repair scalper roll; clean fan
		Packer	Repair clamp
		Nuggetizer	Clean fan
		Conveyor belts	Clean screens in ADS vibrating feeder
2	24	IR receiving facility	Repairs continued on Atlas bin
		Hammermill	Retipping
		Hammermill feed conv.	Repair guard
		Packer	Repair hose; oil
		Classifier cyclone	Weld on pneumatic pipe and patch hole
		Vibrating conveyors	Clean motor 1; tighten bolts
3	3	IR receiving facility	Maintenance outage
		Hammermill	Retipping
		Packer	Grease
		Hammermill feed conv.	Grease
		ADS	Thaw rotary airlock feeder; clean fan
		Storage bin	Grease screw conveyors
		Nuggetizer	Grease; clean fans; tighten bolts
3	10	Nuggetizer	Tighten bolts
		IR receiving facility	Maintenance outage
		Hammermill	Retipping
		Vibrating conveyors	Grease ADS feeder
		ADS	Clean fan
		Nuggetizer	Clean fans; tighten bolts and grease
		Classifier cyclone	Repair elbow on pneumatic pipe
3	17	Nuggetizer	Balance, clean, and grease fan; tighten bolts; tighten V-belts
		Hammermill	Retipping; install seal
		Vibrating conveyor	Tighten bolts on ADS feeder
3	24	Hammermill	Retipping
		ADS	Clean fan; weld duct; install coupling; replace screen on discharge collection hoods
		Vibrating conveyor	Raise ADS feeder 1-1/2 in.; clean screens
		Storage bin	Change lugs on screw conveyor
		Nuggetizer	Tighten bolts
3	31	Hammermill	Retipping
		Storage bin	Clean Atlas conveyor
		Nuggetizer	Tighten and clean fan; grease; tighten drive belt

Table A-11, (Continued)

Week of 1977 Month	Day	Equipment	Description
5	7	US receiving facility	Bracket of conveyor drive motor breakage; Atlas bin sweep drive failure
		Hammermill	Retipping
		ADS	Clean fan
		Muggerizer	Grease and clean fan, tighten bolts
		Packer	Repair backstop and bin
5	14	Storage bin	Electrical failure
		Magnetic belt	Mistrack
		Muggerizer	Heavy vibrations result in motor off balance; clean and grease fan
		Hammermill	Retipping, install seal, change grates
		ADS	Grease, adjust blades on rotary airlock feeder
		Hammermill feed conv.	Adjust belt
		Vibrating conveyor	Grease
		ADS cyclone	Repair hole in pneumatic pipe
5	21	Storage bin	Shuttle belt conveyor fuses blown
		Hammermill	Retipping, oil, change grates
		Muggerizer	Clean and grease fan
5	28	US receiving facility	Screw conveyor bearing repair
		Hammermill	Retipping, change grates
		ADS	Install fan guard, balance rotor
		Muggerizer	Clean and grease fan
		Conveyor belts	Install wiper on hammermill discharge conveyor
6	4	Hammermill	Hammers reversed, install seals
		Vibrating conveyor	New bushing on hammermill feeder
		Muggerizer	Clean and grease fan
		ADS	Weld pneumatic pipe elbow
6	11	Muggerizer	Muggerizer motor jammed, clean and grease fan
		ADS	Repairs of broken bearings on drag chain
		Hammermill	Retipping, paint bearings
		US receiving facility	Screw conveyor bearing failure; motor off track
6	18	Hammermill	Hammermill motor repair, retipping
		Packer	Repair backstop
		Muggerizer	Clean and grease fan
		Vibrating conveyor	Grease ADS feeder
		Storage bin	Repair hole in oil case of screw conveyor drive; change lugs on screw conveyor
6	25	Hammermill	Retipping; waiting for hammermill electrical parts
		US receiving facility	Repair pneumatic conveying lines
		Hammermill feed conv.	Clean
		Packer	Oil
		ADS	Weld crack, replace worn drive belts on conveyors and feeders
		ADS cyclone	Seal pipe

Table A-11. (Continued)

Week of [illegible] (Month)	Day	Equipment	Description
6	2	Hammermill ADM ADM vibrating feeder	Repair air filters, motor repair Repair chain on drag conveyor, weld elbow pipe Clean screen
6	9	Hammermill ADM CE receiving facility Conveyor belts	Hammermill electrical repairs completed Replaced broken chain link Repair pneumatic conveying lines Make new motor guard for belt conveyor
6	16	ADM Vibrating conveyor	Turn blades around in rotary airlock feeder Put in bushings in hammermill feeder drive
6	23	Processing plant Hammermill	Electric power off to repair distribution substation Retipping; seals
6	30	Hammermill ADM Packer	Clean fan; add oil Clean fan Weld back slip
7	7	Hammermill Vibrating conveyor ADM	Change oil; retipping Grease ADM feeder Repair crack in drag chain conveyor
7	14	ADM Packer Hammermill Nuggetizer	Drag chain had worn holes in bottom of surge bin Malfunctioning electrical connector Retipping Grease and tighten fan
7	21	Hammermill Nuggetizer Vibrating conveyor	Retipping; change grates Tighten bolts, hardface hammers Repair oil leak on ADM feeder drive
7	28	Hammermill Magnetic drum Nuggetizer	Retipping Patch shield hole Grease and tighten fan
8	4	Hammermill Vibrating conveyor ADM cyclone Nuggetizer	Retipping, weld crack, seal weld disks Clear chute on ADM feeder, repair seal Inspect pneumatic pipe Grease and tighten fan
8	11	Hammermill ADM	Hammermill fuse blown; change hammers Clear airline
8	18	Hammermill ADM Nuggetizer	Retipping Repair flights on drag chain conveyor; clean fan Grease and tighten fan
8	25	Hammermill	Replace interior baffles

Table A-11. (Concluded)

Week of [illegible] Month	Day	Equipment	Description
9	1	Hammermill	Hammermill retipping
		ADS	Replace surge bin drag chain; clean pneumatic fan
		Nuggetizer	Tighten bolts and grease
9	8	Hammermill	Repair seal
		ADS	Clean pneumatic fan
		Nuggetizer	Tighten bolts and grease
9	15	Magnetic drum	Install new end plates and rubber seals
		ADS	Paint surge bin; install bolts on fan
9	22	Hammermill	Retipping; lubricate

Table 6-11. DAILY RECORDED VALUES OF PLANT OPERATING CONDITIONS

Date 1974		Test	Electric power used (kWh)		Equipment amp daily readings				Outdoor ambient		Hammermill bearing skin temp. (°C)		ADS fan		
							Storage						Air flow		
Month	Day	day	Total plant	Hammermill	Hammermill	ADS fan	bin screw conveyor	Magnetic	Temp (°C)	% RH	Inboard	Outboard	(actual m³/s)	Temp (°C)	% RH
9	23	1	7,200	Data	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	24	2	6,720	not	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	25	3	6,400	recorded	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	26	4	6,400		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	27	5	6,720		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	28	6	6,720		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	1	7	7,200		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	2	8	6,960		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	3	9	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	4	10	6,400		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	7	11	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	8	12	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	9	13	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	10	14	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	11	15	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	15	16	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	16	17	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	17	18	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	18	19	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	21	20	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	22	21	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	23	22	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	24	23	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	25	24	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	25	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	26	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	27	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	28	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	29	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	30	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	31	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	2	32	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	3	33	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	4	34	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	35	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	36	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	37	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	38	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table A-11. (Continued)

Table A-11. (Continued)

Table 6-11. (Concluded)

Table A-13. TEMPERATURE AND RELATIVE HUMIDITY OF HAMMERMILL DUST COLLECTION SYSTEM CYCLONE EXHAUST

Date			Cyclone exhaust	
Month	Day	Test day	Temp. (°C)	% RH
(1974)				
11	21	28	29	100
11	22	29	33	100
(1975)				
6	19	98	46	100
6	21	99	43	100
6	30	113	49	100
7	1	114	49	100
7	2	115	49	100
7	16	123	47	100
7	17	124	50	100
7	18	125	46	100
7	20	126	43	100
8	1	127	43	100

Note: Dust collection system discontinued from service after August 1, 1975.

APPENDIX B

TABULATIONS OF DATA ON ANALYSIS OF REFUSE SAMPLES

[illegible]

[illegible]

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
Paper	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aggregate	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Chemical analysis [illegible]								
Ash	[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]					
[illegible]								
[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
[illegible]								
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]

Table [illegible]. SUMMARY OF [illegible] PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF [illegible]
(Production week [illegible])

	11 Mill discharge	12 Cyclone discharge	13 Storage bin discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal by-products
Quantity (Mg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Heating value (kJ/kg)	[illegible]	[illegible]		[illegible]		[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]		[illegible]		[illegible]
Moisture (wt. %)	[illegible]	[illegible]		[illegible]		[illegible]
Composition (wt. % dry basis)						
Paper	[illegible]	[illegible]		[illegible]		[illegible]
Plastic	[illegible]	[illegible]		[illegible]		[illegible]
Wood	[illegible]	[illegible]		[illegible]		[illegible]
Glass	[illegible]	[illegible]		[illegible]		[illegible]
Magnetic metal	[illegible]	[illegible]		[illegible]		[illegible]
Other metals	[illegible]	[illegible]		[illegible]		[illegible]
Organics	[illegible]	[illegible]		[illegible]		[illegible]
Miscellaneous	[illegible]	[illegible]		[illegible]		[illegible]
Chemical analysis (wt. %)						
Ash	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]						
[illegible]				[illegible]		[illegible]
[illegible]				[illegible]		[illegible]
[illegible]				[illegible]		[illegible]
[illegible]				[illegible]		[illegible]
Size (mm)						
Percent larger than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Particle size						
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]

Table B-14. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF OCTOBER 21, 1974
(Production week 3)

	S1 Mill discharge	S2 Cyclone discharge	S3 Storage bin discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-product
Quantity (Mg)	716.7	587.2	180.1	61.5	1.1	35.7
Heating value (kJ/kg)	11,530	12,110		7,385		5,197
Bulk density (kg/m³)	127	88		606		1,009
Moisture (wt. %)	19.86	20.62		13.33		3.71
Composition (wt. %)						
Paper	58.1	51.6		7.9		0
Plastic	6.5	6.7		1.5		0.1
Wood	1.7	3.1		5.8		0
Glass	3.7	1.6		15.7		0
Magnetic metal	3.3	2.5		13.0		99.6
Other metals	1.4	0.7		6.1		0.06
Organics	1.7	3.8		17.2		0
Miscellaneous	11.9	28.7		33.8		0.3
Chemical analysis (wt. %)						
Ash	23.84	18.73				
Fe (Fe_2O_3)	1.14	1.41				
Al (Al_2O_3)	1.36	1.63				
Ca (CaO)	0.31	0.21				
Pb (PbO)	0.02	0.07				
Si (SiO_2)	0.71	0.53				
Zn (ZnO)	0.35	0.06				
Ferrous analysis (wt. %)						
Fe				5.30		<1.00
Tin (Sn)				11.81		85.56
Al				18.07		0.08
Cu				3.23		0.006
Size (mm)						
Percent larger than [illegible]	0	0		4.9		0
Percent less than [illegible]	100.0	100.0		95.1		100.0
Percent less than [illegible]	97.2	98.5		93.4		99.5
Percent less than [illegible]	73.8	73.3		61.7		97.1
Percent less than [illegible]	47.1	37.7		32.0		1.9
Percent less than [illegible]	31.3	30.7		12.2		0.8
Percent less than [illegible]	18.1	21.8		3.3		0.1
Particle size						
Geometric mean diameter (mm)	8.1	8.1		11.5		17.3
Geometric standard deviation	2.81	2.37		2.18		1.57

Table B-12. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF NOVEMBER 15, 1976
(Production week 8)

	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal byproducts
Quantity (Mg)	866.0	815.1	836.5	15.7	1.1	19.8
Heating value (kJ/kg)	12,136	12,071		1,980	5,506	5,201
Bulk density (kg/m³)	58	75		69	1,108	976
Moisture (wt. %)	18.25	21.86		15.86	0.21	0.09
Composition (wt. %)						
(dry basis)						
Paper	55.9	65.1		1.3	0	0
Plastic	5.0	7.1		1.8	0.7	0
Wood	1.8	2.1		0.4	0.5	0
Glass	1.8	0.9		[illegible]	0	0
Magnetic metal	1.2	0		1.3	85.8	99.8
Other metals	1.1	0.6		1.5	9.0	0.1
Organics	1.7	2.0		31.8	0	0
Miscellaneous	30.6	22.1		23.1	0.1	0.1
Chemical analysis (wt. %)						
Ash	22.63	17.58				
Fe (Fe_2O_3)	1.03	0.83				
Al (Al_2O_3)	1.05	1.38				
Cu (CuO)	0.03	[illegible]				
Pb (PbO)	1.23	2.08				
Ni (NiO)	0.01	0.03				
Zn (ZnO)	0.16	0.17				
Metal analysis (wt. %)						
Fe				1.30	13.89	87.16
Tin cans				6.87	72.36	58.06
Al				1.36	11.53	3.60
Cu				0.18	0.38	0.06
Size (mm)						
Percent larger than 63.5	0	1.9		1.9		0
Percent less than 63.5	100.0	98.1		99.1		100.0
Percent less than 38.1	97.1	93.6		96.9		87.1
Percent less than 19.1	73.3	65.6		87.7		58.3
Percent less than 9.5	53.1	38.7		55.9		1.8
Percent less than 4.8	35.3	25.0		11.9		0.5
Percent less than 2.3	17.0	10.1		5.5		0.2
Particle size						
Geometric mean diameter (mm)	5.7	11.1		12.6		19.8
Geometric standard deviation	2.69	2.07		1.21		1.18

[illegible] SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF NOVEMBER [illegible]

[illegible]

Table 3-15. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF DECEMBER [illegible], 1975
(Production week [illegible])

	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal by-products
Quantity (Mg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Heating value (kJ/kg)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Composition (wt. %)						
Hand-sorted						
Paper	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Plastics	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Chemical analysis (wt. %)						
Ash	[illegible]	[illegible]				
Fe (Fe_2O_3)	[illegible]	[illegible]				
Al (Al_2O_3)	[illegible]	[illegible]				
Cu (CuO)	[illegible]	[illegible]				
Zn (ZnO)	[illegible]	[illegible]				
Ni (NiO)	[illegible]	[illegible]				
Pb (PbO)	[illegible]	[illegible]				
Metals analysis (wt. %)						
Cu				[illegible]	[illegible]	[illegible]
Tin (Sn)				[illegible]	[illegible]	[illegible]
Al				[illegible]	[illegible]	[illegible]
Pb				[illegible]	[illegible]	[illegible]
Size (mm)						
Percent larger than 63.5	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than 63.5	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than 38.1	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than 19.1	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than 9.5	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than 4.8	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than 2.4	[illegible]	[illegible]		[illegible]		[illegible]
Particle size						
Geometric mean diameter (mm)	[illegible]	[illegible]		[illegible]		[illegible]
Geometric standard deviation	[illegible]	[illegible]		[illegible]		[illegible]

[illegible]

Table [illegible] SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF [illegible]
[illegible]

	Mill discharge	Cyclone discharge	Storage bin discharge	Magnetic belt [illegible]	Magnetic drum [illegible]	Ferrous metal [illegible]
Quantity (Mg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Heating value (kJ/kg)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Composition (wt. %) [illegible]						
Paper	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Chemical analysis (wt. %)						
Ash	[illegible]	[illegible]				
Fe (Fe_2O_3)	[illegible]	[illegible]				
Al (Al_2O_3)	[illegible]	[illegible]				
Cu (CuO)	[illegible]	[illegible]				
Pb (PbO)	[illegible]	[illegible]				
Ni (NiO)	[illegible]	[illegible]				
Zn (ZnO)	[illegible]	[illegible]				
Metal analysis (wt. %)						
Fe				[illegible]	[illegible]	[illegible]
Tin cans				[illegible]	[illegible]	[illegible]
Al				[illegible]	[illegible]	[illegible]
Cu				[illegible]	[illegible]	[illegible]
Size (mm)						
Percent larger than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Particle size						
Geometric mean diameter (mm)	[illegible]	[illegible]		[illegible]		[illegible]
Geometric standard deviation	[illegible]	[illegible]		[illegible]		[illegible]

Table B-15. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF JANUARY 5, 1976
(Production Week 15)

	11 Mill discharge	12 Cyclone discharge	13 Storage bin discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous [illegible] [illegible]
Quantity (Mg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Heating value (kJ/kg)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Composition (wt. %) [illegible]						
Paper	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]		[illegible][a]	[illegible]	[illegible][a]
Other metals	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Chemical analysis (wt. %)						
Ash	[illegible]	[illegible]				
Fe (Fe_2O_3)	[illegible]	[illegible]				
Al (Al_2O_3)	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible] analysis (wt. %)						
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
Size (mm)						
Percent larger than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Particle size						
Geometric mass diameter (mm)	[illegible]	[illegible]		[illegible]		[illegible]
Geometric standard deviation	[illegible]	[illegible]		[illegible]		[illegible]

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[a] [illegible]

Table 8-11. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF JANUARY 17, 1977
(Production week 1)

	S1 Mill discharge	S2 Cyclone discharge	S3 Storage bin discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-product
Quantity (Mg)	601.8	396.8	450.4	61.1	0.1	38.0
Heating value (kJ/kg)	11,757	11,611		5,706	6,367	5,065
Bulk density (kg/m³)	71	61		711	1,001	1,011
Moisture (wt. %)	11.30	22.60		10.60	0.23	0.11
Composition (wt. %, as-received)						
Paper	56.2	66.5		0.1	0	0.1
Plastic	4.4	2.1		0.8	0.2	tt
Wood	0.3	0.7		1.1	0.3	0
Glass	1.4	0.1		17.3	tt	tt
Magnetic metal	11.8	0		56.5	71.9	99.7
Other metals	1.1	0		0.8	23.7	0.1
Organic	6.1	0.3		18.6	0	0
Miscellaneous	17.6	9.6		5.1	4.0	0.1
Chemical analysis (wt. %)						
Ash	16.57	10.81				
[illegible]	0.61	0.56				
[illegible]	1.13	1.61				
[illegible]	0.61	0.01				
[illegible]	1.34	0.06				
[illegible]	0.01	0.01				
[illegible]	1.30	0.21				
Metal analysis (wt. %)						
[illegible]				6.61	9.67	11.21
[illegible]				51.82	10.86	86.80
[illegible]				1.11	12.67	0.01
[illegible]				2.08	1.30	0
Size (mm)						
Percent larger than 63.5	2.3	0		0		0
Percent less than 63.5	97.7	100.0		100.0		100.0
Percent less than 38.1	88.6	98.8		96.1		100.0
Percent less than 19.1	55.1	89.9		60.1		62.9
Percent less than 9.5	25.1	35.0		15.9		16.1
Percent less than 6.4	13.9	18.1		6.5		0.6
Percent less than 3.0	6.8	11.7		1.8		0.1
Particle size						
Geometric mean diameter (mm)	16.1	10.7		11.5		15.7
Geometric standard deviation	2.78	2.51		1.96		1.83

TABLE [illegible]. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF JANUARY [illegible]
(Production week [illegible])

	[illegible]	[illegible]	Storage bin discharge	Magnetic belt rejects	Magnetic drum rejects	Ferrous metal [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 8-10. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF JANUARY [illegible], [illegible]
Production week [illegible]

	01 Mill discharge	02 Cyclone discharge	03 Storage bin discharge	[illegible] Magnetic belt rejects	[illegible] Magnetic drum rejects	[illegible] Ferrous metal byproduct
Quantity (Mg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Heating value (kJ/kg)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Composition (wt. %) [illegible]						
Paper	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Chemical analysis (wt. %)						
Ash	[illegible]	[illegible]				
Fe [illegible]	[illegible]	[illegible]				
Al [illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
Pb [illegible]	[illegible]	[illegible]				
Ni [illegible]	[illegible]	[illegible]				
Zn [illegible]	[illegible]	[illegible]				
[illegible] analysis (wt. %)						
[illegible]						
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
Size (mm)						
Percent larger than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Particle size						
Geometric mean diameter (mm)	[illegible]	[illegible]		[illegible]		[illegible]
Geometric standard deviation	[illegible]	[illegible]		[illegible]		[illegible]

[illegible]

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]						
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]						
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]						
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]						
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]						
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]

[illegible]

	Mill discharge	Cyclone discharge	Storage bin discharge	Magnetic belt rejects	Magnetic drum rejects	Ferrous metal by-products
Quantity (Mg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Heating value (kJ/kg)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Composition (wt. %, [illegible])						
Paper	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Plastics	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Chemical analysis (wt. %)						
Ash	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]						
[illegible]			[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
Size (mm)						
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Particle size						
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
[illegible]	[illegible]	[illegible]		[illegible]		[illegible]

Table B-11: SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF MARCH 31, 1975
(Production Week 35)

	01 Mill discharge	02 Cyclone discharge	03 Storage bin discharge	05 Magnetic belt rejects	07 Magnetic drum rejects	51 Ferrous metal by-products
Quantity (Mg)	1,182.0	1,130.9	1,130.9	51.1	1.8	51.1
Heating value (kJ/kg)	11,265	11,098		5,138	2,221	5,171
Bulk density (kg/m³)	112	74.5		755	1,052	1,001
Moisture (wt. %)	18.53	23.15		13.31	0.11	0.18
Composition (wt. %, as received)						
Paper	50.1	68.3		3.1	0	0
Plastic	5.9	1.9		7.5	0.2	0
Wood	7.7	3.5		1.8	0.1	0
Glass	1.7	3.5		29.8	11	0
Magnetic metal	8.5	1.1		15.1	85.1	99.9
Other metals	2.5	0.1		8.1	0.6	0.1
Organics	5.2	2.3		27.5	12	0
Miscellaneous	19.6	16.3		15.8	1.0	11
Chemical analysis (wt. %)						
Ash	23.12	16.35				
Fe (Fe_2O_3)[a]	1.92	1.11				
Al (Al_2O_3)[a]	2.68	1.72				
Cu (CuO)[a]	0.03	0.03				
Pb (PbO)[a]	0.11	0.05				
Ni (NiO)[a]	0.03	0.02				
Zn (ZnO)[a]	0.08	0.06				
Metal analysis (wt. %)						
Fe				5.83	19.81	15.11
Tin cans				9.99	67.65	84.50
Al				3.81	10.55	0.11
Cu				0.83	0.88	0.03
Size (mm)						
Percent larger than 63.5	2.9	2.3		0.5		0.0
Percent less than 63.5	97.1	99.7		99.5		100.0
Percent less than 38.1	95.1	95.7		90.5		99.3
Percent less than 19.1	83.8	80.3		63.5		55.1
Percent less than 9.5	61.7	60.5		35.6		9.7
Percent less than 4.8	33.6	36.3		13.9		0.8
Percent less than 2.4	15.8	18.3		6.1		0.1
Particle size						
Geometric mean diameter (mm)	10.3	8.2		12.6		17.1
Geometric standard deviation	2.91	2.82		2.39		1.63

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[a] Data taken from weekly composite.

[illegible]

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Quantity (Mg)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Heating value (kJ/kg)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Bulk density (kg/m³)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Moisture (wt. %)	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Composition (wt. %) [illegible]						
Paper	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Plastic	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Wood	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Glass	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Magnetic metal	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Other metals	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Organics	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Chemical analysis (wt. %)						
Ash	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]				
Metal analysis (wt. %)						
Fe				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
Al				[illegible]	[illegible]	[illegible]
[illegible]				[illegible]	[illegible]	[illegible]
Size (cm)						
Percent larger than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Percent less than [illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Particle size						
Geometric mean diameter (cm)	[illegible]	[illegible]		[illegible]		[illegible]
Geometric standard deviation	[illegible]	[illegible]		[illegible]		[illegible]

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a/ Data taken from weekly composite.

Table B-11. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF APRIL 11-15, 1977
(Production week 27)

	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal byproducts
Quantity (Mg)	819.1	688.1	698.1	56.7	2.6	28.1
Heating value (kJ/kg)	7,856	11,275		5,533	4,433	4,170
Bulk density (kg/m³)	111	91		636	1,103	618
Moisture (wt. %)	22.72	13.67		16.97	2.08	3.11
Composition (wt. %) (dry basis)						
Paper	56.7	63.7		5.6	2	11
Plastics	5.9	6.6		1.9	3.1	9
Wood	6.1	6.7		3.6	11	3
Glass	4.6	2.2		18.6	16	1
Magnetic metal	1.4	1		5.6	61.7	81.8
Other metals	2.3	2.5		6.3	6.7	0.1
Organics	3.3	3.1		26.6	2	0
Miscellaneous	18.5	15.6		27.3	1.1	3.1
Chemical analysis (wt. %)						
Ash	21.30	12.99				
Fe $(Fe_2O_3)^a$	1.36	1.96				
Al $(Al_2O_3)^a$	1.16	1.76				
Cu $(CuO)^a$	0.26	0.31				
Pb $(PbO)^a$	0.13	0.16				
Zn $(ZnO)^a$	0.25	0.35				
Cr $(CrO)^a$	0.16	0.19				
Metals analysis (wt. %)						
Fe				1.62	16.37	17.81
Tin cans				17.35	73.27	88.17
Al				2.57	10.38	3.13
Cu				1.40	5.63	3
Size (mm)						
Percent larger than 63.5	0.0	0.0		0.0		0.0
Percent less than 63.5	100.0	100.0		100.0		100.0
Percent less than 38.1	95.7	98.7		93.3		78.6
Percent less than 19.1	76.7	76.1		59.1		53.5
Percent less than 9.5	53.6	49.6		38.7		15.1
Percent less than 4.8	41.1	28.8		11.3		5.6
Percent less than 2.4	22.3	20.6		6.5		2.2
Particle size						
Geometric mean diameter (mm)	7.7	8.1		15.8		17.6
Geometric standard deviation	3.07	2.85		3.13		1.63

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a/ Data taken from weekly composite.

Table 8-11. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR JUNE [illegible] TO APRIL [illegible], 1979
FINE GRIND 11 MM DIAMETER HAMMERMILL GRATE OPENINGS
(Production week 30)

	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge[a]	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal by-products
Quantity (Mg)	669.1	661.8	661.8	51.8	2.1	10.9
Heating value (kJ/kg)	9,477	7,631		4,557	8,100	8,169
Bulk density (kg/m³)	167	155		796	1,376	1,196
Moisture (wt. %)	26.83	25.38		7.11	1.06	3.12
Composition (wt. %) (as received)						
Paper	11.4	18.3		3.5	0	0
Plastic	1.7	1.8		1.6	11	0
Wood	4.0	2.2		3.6	0.1	0
Glass	3.7	1.8		11.3	0.1	0
Magnetic metal	7.1	0		11.1	88.1	83.3
Other metals	3.6	0.1		3.7	1.3	11
Organics	6.5	3.1		7.6	11	2
Miscellaneous	21.8	19.8		28.6	0.4	0.1
Chemical analysis (wt. %)						
Ash	25.71	18.15				
Fe (Fe_2O_3)[b]	5.85	1.58				
Al (Al_2O_3)[b]	1.71	1.83				
Cu (CuO)[b]	0.31	0.03				
Pb (PbO)[b]	1.33	3.15				
Ni (NiO)[b]	0.31	0.11				
Zn (ZnO)[b]	0.19	0.33				
Visual analysis (wt. %)						
Fe				1.17	18.63	15.18
Tin cans				11.87	79.12	81.18
Al				3.18	1.53	1.11
Cu				0.86	1.01	0.01
Size (mm)						
Percent larger than 63.5	0.0	0.0		0.0		0.0
Percent less than 63.5	100.0	100.0		100.0		100.0
Percent less than 38.1	99.8	100.0		100.0		100.0
Percent less than 19.1	93.1	97.3		91.1		91.6
Percent less than 9.5	61.2	75.3		50.9		39.6
Percent less than 4.8	31.9	51.1		18.8		3.7
Percent less than 2.4	17.1	30.3		8.3		3.1
Particle size						
Geometric mean diameter (mm)	5.1	3.3		8.8		13.6
Geometric standard deviation	2.33	2.33		1.96		1.34

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a/ Storage bin completely empty at start and finish of fine grind test. Storage bin discharge 33 equals cyclone discharge 32.

b/ Data taken from weekly composite.

Table B-11. SUMMARY OF PROCESSING PLANT MATERIALS FLOWS AND CHARACTERISTICS FOR WEEK OF APRIL 28, 1975
(Production week 29)

	S1 Mill discharge	S2 Cyclone discharge	S3 Storage bin discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
Quantity (Mg)	1,086.1	855.7	669.2	21.1	0.9	50.1
Heating value (kJ/kg)	9,018	9,210		5,670	6,486	1,127
Bulk density (kg/m^3)	118	120		681	1,018	910
Moisture (wt. %)	31.95	31.58		15.26	0.35	0.09
Composition (wt. %) (as received)						
Paper	40.5	56.2		0.6	0	0
Plastic	3.1	3.7		1.6	0.5	0
Wood	5.0	3.7		6.3	0.1	tr
Glass	3.1	1.6		28.1	0.2	0
Magnetic metal	3.5	0		15.6	83.9	99.6
Other metals	0.7	0.1		5.6	13.9	0.1
Organics	8.0	9.3		15.7	tr	0
Miscellaneous	36.0	26.5		26.1	1.3	0.3
Chemical analysis (wt. %)						
Ash	29.21	23.10				
Fe (Fe_2O_3)a/	1.40	1.00				
Al (Al_2O_3)a/	1.72	1.75				
Cu (CuO)a/	0.09	0.03				
Pb (PbO)a/	0.05	0.06				
Ni (NiO)a/	0.01	0.02				
Zn (ZnO)a/	0.11	0.08				
Visual analysis (wt. %)						
Fe				8.60	22.16	13.99
Tin cans				7.13	66.23	85.32
Al				1.19	10.23	0.19
Cu				0.51	0.67	0
Size (mm)						
Percent larger than 63.5	0.5	0.0		0.0		0.0
Percent less than 63.5	99.5	100.0		100.0		100.0
Percent less than 38.1	99.5	96.0		95.1		99.5
Percent less than 19.1	89.8	83.1		65.3		69.3
Percent less than 9.5	61.1	57.9		35.6		6.7
Percent less than 4.8	37.5	36.9		11.7		0.3
Percent less than 2.4	23.9	25.7		3.5		0.1
Particle size						
Geometric mean diameter (mm)	5.5	6.9		11.7		18.1
Geometric standard deviation	2.56	2.77		2.26		1.56

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a/ Data taken from weekly composite.

TABLE B-1[illegible]. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF MAY 5, 1975
(Production test 30)

	11 Mill discharge	12 Cyclone discharge	13 Storage bin discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal byproducts
Quantity (Mg)	51.8	55.2	275.5	5.6	0.2	2.1
Heating value (kJ/kg)	8,180	9,813		3,388	5,106	5,030
Bulk density (kg/m³)	159	123		630	1,060	1,136
Moisture (wt. %)	36.90	30.60		11.70	0.13	0.18
Composition (wt. %) ([illegible])						
Paper	50.3	55.2		0.5	0	0
Plastic	3.1	3.2		0.7	0.1	0
Wood	3.3	6.5		3.3	0	0
Glass	5.5	5.3		22.3	tr	[illegible]
Magnetic metal	1.3	0		21.2	98.1	99.8
Other metals	0.5	0		12.2	1.4	0.1
Organics	15.1	5.7		10.9	0	0
Miscellaneous	21.3	29.8		28.0	0.4	0.1
Chemical analysis (wt. %)						
Ash	19.36	19.91				
Fe (Fe_2O_3)[a]						
Al (Al_2O_3)[a]						
Cu (CuO)[a]						
Pb (PbO)[a]						
Ni (NiO)[a]						
Zn (ZnO)[a]						
Visual analysis (wt. %)						
Fe				8.18	29.56	18.97
Tin cans				10.51	64.63	78.56
Al				4.77	1.30	1.09
Cu				0.88	0.08	[illegible]
Size (mm)						
Percent larger than 63.5	0.0	0.0		5.0		0.0
Percent less than 63.5	100.0	100.0		95.0		100.0
Percent less than 38.1	100.0	100.0		68.3		100.0
Percent less than 19.1	92.3	96.5		50.6		75.8
Percent less than 9.5	69.6	68.1		23.5		14.1
Percent less than 4.8	40.7	48.2		5.7		1.5
Percent less than 2.4	26.2	33.3		2.0		0.0
Particle size						
Geometric mean diameter (mm)	5.0	4.8		16.0		15.3
Geometric standard deviation	3.20	3.16		2.19		1.57

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[a] No composite due to small samp(l) (56.8 Mg processed).

Table B-155. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF MAY 12, 1975
(Production week 31)

	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal byproducts
Quantity (Mg)	735.0	366.8	339.5	30.1	0.3	15.9
Heating value (kJ/kg)	8,620	9,236		5,903	6,576	1,129
Bulk density (kg/m³)	173	166		603	1,060	983
Moisture (wt. %)	31.23	33.63		17.30	0.32	0.12
Composition (wt. %) (12.7 basis)						
Paper	33.1	41.3		2.3	tr	0
Plastic	3.9	6.0		0.7	0.3	0
Wood	8.0	6.1		3.5	0.1	0
Glass	3.3	5.8		23.5	tr	0
Magnetic metal	5.7	0		25.1	86.2	99.9
Other metals	0.5	1.1		8.9	11.3	tr
Organics	26.0	15.8		15.3	0.1	tr
Miscellaneous	22.5	28.9		20.6	1.1	0.1
Chemical analysis (wt. %)						
Ash	26.75	22.25				
Fe (Fe_2O_3)[a]	1.03	0.91				
Al (Al_2O_3)[a]	1.66	1.68				
Cu (CuO)[a]	0.03	0.03				
Pb (PbO)[a]	0.05	0.06				
Ni (NiO)[a]	0.06	0.01				
Zn (ZnO)[a]	0.07	0.05				
Visual analysis (wt. %)						
Fe				1.23	18.86	16.17
Tin cans				15.76	67.09	83.91
Al				3.06	11.96	0.16
Cu				0.67	0.31	0
Size (mm)						
Percent larger than 63.5	0.7	0.0		1.5		0.0
Percent less than 63.5	99.3	100.0		98.5		100.0
Percent less than 38.1	99.1	100.0		97.6		100.0
Percent less than 19.1	88.8	92.1		68.1		62.3
Percent less than 9.5	61.7	73.8		35.5		11.9
Percent less than 4.8	40.3	51.6		13.8		1.0
Percent less than 2.4	25.0	33.9		5.5		0.2
Particle size						
Geometric mean diameter (mm)	6.0	4.7		12.6		16.0
Geometric standard deviation	3.56	3.50		2.72		1.61

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a/ Data taken from weekly composite.

Table B-1??. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF MAY 19, 1975
(Production week 37)

	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal concentrate
Quantity (Mg)	166.7	169.1	169.5	23.6	0.3	17.8
Heating value (kJ/kg)	9,898	10,505		6,750	1,610	1,119
Bulk density (kg/m³)	135	123		638	1,137	988
Moisture (wt. %)	20.50	22.60		10.15	0.06	0.02
Composition (wt. %) (as received)						
Paper	55.3	48.1		0.7	0	0
Plastic	1.9	7.9		1.8	0.3	0
Wood	2.0	3.3		3.1	tr	0
Glass	6.5	5.1		25.1	tr	0
Magnetic metal	3.7	0.9		16.5	95.9	99.9
Other metals	0.5	3.6		10.6	3.5	tr
Organics	8.3	4.5		14.6	tr	0
Miscellaneous	27.9	26.5		27.9	0.6	0.1
Chemical analysis (wt. %)						
Ash	18.13	26.55				
Fe (Fe_2O_3)a/						
Al (Al_2O_3)a/						
Cu (CuO)a/						
Pb (PbO)a/						
Ni (NiO)a/						
Zn (ZnO)a/						
Visual analysis (wt. %)						
Fe				0.06	31.05	16.63
Tin cans				13.07	73.13	82.73
Al				1.20	0.3	0.15
Cu				0.25	0.21	0
Size (mm)						
Percent larger than 63.5	0.0	0.0		2.5		0.0
Percent less than 63.5	100.0	100.0		97.5		100.0
Percent less than 38.1	98.5	97.1		87.2		100.0
Percent less than 19.1	93.1	91.9		57.0		61.5
Percent less than 9.5	67.5	57.1		26.7		7.7
Percent less than 4.8	43.8	41.1		8.7		0.7
Percent less than 2.4	26.6	28.1		3.1		0.2
Particle size						
Geometric mean diameter (mm)	5.5	5.1		16.2		16.5
Geometric standard deviation	3.52	3.66		2.15		1.55

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a/ No composite due to hammermill breakdown.

Table B-144. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF JUNE 30, 1975
(Production week 35)

	51 Mill discharge	52 Cyclone discharge	53 Storage bin discharge	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products
Quantity (Mg)	430.7	361.8	380.0	50.9	0.8	28.1
Heating value (kJ/kg)	10,155	10,303		5,130	1,887	1,138
Bulk density (kg/m³)	131	107		621	1,053	958
Moisture (wt. %)	20.88	13.71		13.83	0.30	0.16
Composition (wt. %) (as received)						
Paper	47.8	60.8		2.6	0	0
Plastic	5.1	3.5		2.6	0.3	0
Wood	3.3	2.5		1.7	tr	0
Glass	3.6	1.9		30.1	tr	0
Magnetic metal	7.2	0		13.8	91.7	99.9
Other metals	1.0	0		5.3	7.6	tr
Organics	5.8	1.8		25.6	0	0
Miscellaneous	27.2	31.5		18.1	0.5	0.1
Chemical analysis (wt. %)						
Ash	27.31	26.63				
Fe (Fe_2O_3)[a]	1.15	0.76				
Al (Al_2O_3)[a]	2.32	2.53				
Cu (CuO)[a]	0.02	0.03				
Pb (PbO)[a]	0.05	0.06				
Ni (NiO)[a]	0.01	0.02				
Zn (ZnO)[a]	0.12	0.08				
Metal analysis (wt. %)						
Fe				6.05	14.08	16.87
Tin cans				15.93	78.01	82.53
Al				5.87	6.61	0.18
Cu				0.86	0.35	0
Size (mm)						
Percent larger than 63.5	0	0		3.1		0
Percent less than 63.5	100.0	100.0		96.9		100.0
Percent less than 38.1	95.2	98.0		93.3		99.7
Percent less than 19.1	80.2	87.8		61.8		60.6
Percent less than 9.5	53.5	61.9		29.6		9.7
Percent less than 4.8	33.9	46.0		11.8		1.2
Percent less than 2.4	21.5	30.7		5.1		0.3
Particle size						
Geometric mean diameter (mm)	7.6	5.8		15.0		18.5
Geometric standard deviation	2.83	2.75		2.37		1.59

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[a] Data taken from weekly composite.

Table B-14a. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF JULY 7, 1975
(Production week 17)

	51 Mill discharge	52 Cyclone discharge	53 Storage bin discharge	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal Recyclables
Quantity (Mg)	791.2	550.7	705.2	43.1	3.9	15.9
Heating value (kJ/kg)	9,677	8,373		3,956	1,022	1,132
Bulk density (kg/m³)	134	136		539	989	918
Moisture (wt. %)	31.83	32.78		15.90	7.21	0.18
Composition (wt. %) (As received)						
Paper	57.1	63.3		2.5	0	0
Plastic	3.1	2.1		1.2	0.2	0
Wood	1.1	1.6		7.6	tr	0
Glass	1.8	1.9		27.0	0	0
Ferrous metal	5.8	0		11.3	91.5	99.7
Other metals	0.7	0		5.1	7.5	tr
Organics	5.3	5.1		15.3	0	0
Miscellaneous	26.1	25.9		31.2	0.8	0.3
Chemical analysis (wt. %)						
Ash	31.53	21.02				
Fe (Fe_2O_3)[a]	1.36	0.77				
Al (Al_2O_3)[a]	1.51	1.23				
Ca (CaO)[a]	0.23	0.01				
Cl (Cl)[a]	0.06	0.08				
Si (SiO_2)[a]	2.77	3.12				
Zn (ZnO)[a]	0.11	0.35				
Visual analysis (wt. %)						
Fe				2.59	17.66	15.55
Tin cans				16.75	78.13	84.13
Al				8.96	0.29	0.12
Cu				1.15	0.20	0
Size (mm)						
Percent larger than 51.1	0.1	0		0.8		0
Percent less than 51.1	99.9	100.0		99.2		100.0
Percent less than 38.1	97.7	99.7		95.4		99.7
Percent less than 19.1	86.3	90.2		61.9		56.6
Percent less than 9.5	63.1	67.6		25.3		6.7
Percent less than 4.8	41.7	46.7		9.7		1.0
Percent less than 2.4	27.4	29.1		4.7		0.2
Particle size						
Geometric mean diameter (mm)	4.1	3.8		11.8		17.3
Geometric standard deviation	2.76	2.56		2.16		1.57

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[a] Data taken from weekly composite.

Table B-[illegible]. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF JULY 16, 1979
(Production week 38)

	11 Mill discharge	12 Cyclone discharge	13 Storage bin discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal byproducts
Quantity (Mg)	842.3	739.7	601.0	81.1	1.0	28.5
Heating value (kJ/kg)	9,778	10,120		5,130	8,361	5,037
Bulk density (kg/m³)	141	109		680	1,008	956
Moisture (wt. %)	27.85	25.18		11.47	0.29	0.19
Composition (wt. %) (as-received)						
Paper	50.0	53.5		0.7	0.1	Tr
Plastic	3.1	7.0		1.0	0.8	0
Wood	7.1	3.8		5.4	0.1	0
Glass	4.5	4.6		38.4	0.2	0
Magnetic metal	1.7	1		13.5	87.1	99.5
Other metals	0.4	0.4		5.6	10.6	0.2
Organics	13.1	3.8		8.1	0.1	0
Miscellaneous	20.9	27.2		29.6	1.1	0.3
Chemical analysis, dry %						
Ash	25.48	16.04				
Fe (Fe_2O_3)a/	0.87	0.69				
Al (Al_2O_3)a/	1.15	1.37				
Cu (CuO)a/	0.06	0.01				
Pb (PbO)a/	0.07	0.05				
Ni (NiO)a/	0.02	0.03				
Zn (ZnO)a/	0.10	0.06				
Visual analysis (wt. %)						
Fe				7.86	21.52	12.55
Tin cans				14.82	68.01	85.36
Al				5.51	9.66	0.06
Cu				0.58	0.37	0.02
Size (mm)						
Percent larger than 63.5	0	1.0		0		0
Percent less than 63.5	100.0	99.0		100.0		100.0
Percent less than 38.1	99.1	97.0		97.5		100.0
Percent less than 19.1	86.9	72.9		65.8		55.9
Percent less than 9.5	56.7	47.8		12.5		8.0
Percent less than 4.8	35.4	32.8		8.5		0.6
Percent less than 2.4	21.4	21.3		1.7		0.3
Particle size						
Geometric mean diameter (mm)	6.7	8.1		13.2		17.3
Geometric standard deviation	2.53	2.85		2.01		1.56

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a/ Data taken from weekly composites.

Table B-1gg. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF JULY 28, 1975
(Production week 50)

	51 Mill discharge	53 Cyclone discharge	61 Storage bin discharge	65 Magnetic belt rejects	67 Magnetic drum rejects	68 Ferrous metal concentrate
Quantity (Mg)	317.1	308.4	326.3	25.3	0.6	15.2
Heating value (kJ/kg)	10,709	9,838		6,603	5,876	1,121
Bulk density (kg/m³)	121	111		633	906	910
Moisture (wt. %)	23.40	30.65		15.73	0.38	0.10
Composition (wt. %)						
(as received)						
Paper	36.7	50.6		2.1	0.1	0
Plastic	7.6	7.1		3.0	0.5	0
Wood	3.1	3.5		7.6	0.3	0
Glass	2.9	1.9		31.2	0.6	0
Magnetic metal	5.0	0		18.6	81.1	99.8
Other metals	0.9	0.1		3.2	15.7	tr
Fines	13.3	12.5		2.0	0.1	0.1
Miscellaneous	31.6	20.9		19.7	1.8	0.1
Chemical analysis (wt. %)						
Ash	22.21	12.31				
Fe (Fe_2O_3)a/						
Al (Al_2O_3)a/						
Cu (CuO)a/						
Pb (PbO)a/						
Ni (NiO)a/						
Zn (ZnO)a/						
Visual analysis (wt. %)						
Fe				5.56	15.27	18.93
Tin cans				18.23	68.27	81.07
Al				7.51	15.50	0.25
Cu				0.10	0.50	0
Size (mm)						
Percent larger than 63.5	0	0.4		0		0
Percent less than 63.5	100.0	99.6		100.0		100.0
Percent less than 38.1	97.5	98.7		100.0		100.0
Percent less than 19.1	85.5	77.3		60.2		58.5
Percent less than 9.5	53.8	53.3		23.3		9.2
Percent less than 4.8	36.5	35.9		7.2		0.8
Percent less than 2.4	21.1	26.9		3.2		0.3
Particle size						
Geometric mean diameter (mm)	7.6	7.6		14.0		17.0
Geometric standard deviation	2.57	2.86		1.95		1.59

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a/ No composite due to equipment breakdown.

Table E-10?. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF AUGUST 5, 1975
(Production test 51)

	01 Mill discharge	02 Cyclone discharge	03 Storage bin discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	20 Ferrous metal by-product
Quantity (Mg)	1,027.7	880.2	726.1	68.6	0.9	25.7
Heating value (kJ/kg)	10,570	9,263		5,683	1,798	1,132
Bulk density (kg/m^3)	128	132		601	1,031	956
Moisture (wt. %)	20.33	30.10		10.51	0.13	0.16
Composition (wt. %)						
Paper	47.6	55.6		1.1	0	0
Plastic	3.5	5.0		1.0	0.3	0
Wood	3.4	2.9		5.1	0.1	0
Glass	3.5	3.6		28.7	0	0
Magnetic metal	7.3	0		13.5	93.8	99.7
Other metals	1.1	0.6		11.0	5.0	0.1
Organics	7.3	6.9		19.1	0	0
Miscellaneous	26.5	25.8		20.5	1.6	0.3
Chemical analysis (wt. %)						
Ash	22.96	21.11				
Fe (Fe_2O_3)a/	0.99	0.93				
Al (Al_2O_3)a/	1.39	1.39				
Cu (CuO)a/	0.03	0.03				
Pb (PbO)a/	0.06	0.05				
Ni (NiO)a/	0.06	0.03				
Zn (ZnO)a/	0.05	0.05				
Visual analysis (wt. %)						
Fe				3.01	16.50	17.13
Tin cans				11.16	77.63	82.26
Al				6.53	3.16	0.08
Cu				0.26	0.07	0
Size (mm)						
Percent larger than 63.5	3.8	0		0		0
Percent less than 50.8	95.7	100.0		100.0		100.0
Percent less than 38.1	93.1	99.5		96.6		100.0
Percent less than 19.1	68.0	73.6		69.3		63.2
Percent less than 9.5	43.8	51.3		36.6		11.5
Percent less than 4.8	26.5	36.3		11.6		1.0
Percent less than 2.4	15.7	21.2		3.6		0.3
Particle size						
Geometric mean diameter (mm)	10.1	7.9		12.2		16.0
Geometric standard deviation	3.88	2.86		3.18		1.61

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a/ Data taken from weekly composite.

Table B-111. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF AUGUST 11, 1975
(Production week 53)

	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal by-products
Quantity (Mg)	760.1	567.6	563.0	73.0	0.8	19.7
Heating value (kJ/kg)	9,619	9,079		7,650	5,900	5,130
Bulk density (kg/m³)	135	111		435	1,037	951
Moisture (wt. %)	30.97	19.70		20.17	0.36	0.20
Composition (wt. %) (by 5 types)						
Paper	43.5	51.8		0.2	0	0
Plastic	8.1	5.9		0.9	0.3	0
Wood	5.7	3.7		7.6	11	0
Glass	3.0	5.3		26.5	0.2	0
Magnetic metal	6.5	0		9.1	88.3	99.6
Other metals	0.9	0.6		8.1	7.5	0.3
Organics	7.1	6.8		28.5	0	0
Miscellaneous	28.3	25.9		20.5	3.8	0.1
Chemical analysis (wt. %)						
Ash	11.13	15.33				
Fe (Fe_2O_3)[a]	0.70	0.61				
Al (Al_2O_3)[a]	1.51	1.39				
Cu (CuO)[a]	0.09	0.07				
Pb (PbO)[a]	0.35	0.06				
Ni (NiO)[a]	0.03	0.11				
Sn (SnO)[a]	0.11	0.05				
Visual analysis (wt. %)						
Fe				5.66	16.90	17.93
Tin cans				10.11	65.61	81.04
Al				4.51	6.93	0.07
Cu				1.09	0.15	0
Size (mm)						
Percent larger than 63.5	0	0		4.2		0
Percent less than 63.5	100.0	100.0		95.8		100.0
Percent less than 38.1	97.8	99.4		86.7		100.0
Percent less than 19.1	78.7	75.9		67.0		52.0
Percent less than 9.5	51.6	53.5		31.6		7.1
Percent less than 4.8	30.7	36.5		11.3		0.8
Percent less than 1.6	16.3	22.6		4.5		0.3
Particle size						
Geometric mean diameter (mm)	8.1	7.1		13.0		17.8
Geometric standard deviation	7.66	3.78		3.25		1.58

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[a] Data taken from weekly composite.

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Table B-11. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF AUGUST 18, 1975
(Production week 13)

	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal briquettes
Quantity (Mg)	815.5	716.3	716.3	66.0	1.0	27.6
Heating value (kJ/kg)	9,718	9,625		6,875	6,036	3,133
Bulk density (kg/m³)	136	130		602	1,016	965
Moisture (wt. %)	26.63	25.33		10.98	0.32	0.30
Composition (wt. %) (as received)						
Paper	53.7	52.1		0.6	tr	0
Plastic	6.7	6.1		1.2	0.3	0
Wood	5.1	6.1		4.9	0.1	0
Glass	5.2	3.7		36.3	0.2	0
Magnetic metal	6.8	0.3		9.3	91.1	99.8
Other metals	1.0	0.4		4.9	7.1	0.1
Organics	9.3	7.2		21.7	tr	0
Miscellaneous	26.7	26.8		23.1	1.6	0.2
Chemical analysis (wt. %)						
Ash	16.69	18.18				
Fe (Fe_2O_3)a/	0.95	0.81				
Al (Al_2O_3)a/	1.13	1.66				
Cu (CuO)a/	0.03	0.01				
Pb (PbO)a/	0.03	0.07				
Ni (NiO)a/	0.03	0.03				
Zn (ZnO)a/	0.08	0.07				
Visual analysis (wt. %)						
Fe				7.62	22.00	17.28
Tin cans				4.85	68.98	81.66
Al				2.90	7.56	1.06
Cu				0.53	0.46	0
Size (mm)						
Percent larger than 63.5	0	0		0		0
Percent less than 63.5	100.0	100.0		100.0		100.0
Percent less than 38.1	96.3	98.5		95.7		100.0
Percent less than 19.1	75.9	85.4		68.8		38.3
Percent less than 9.5	53.9	58.6		36.6		8.7
Percent less than 4.8	32.7	39.5		13.3		1.1
Percent less than 2.5	19.8	26.0		6.0		0.5
Particle size						
Geometric mean diameter (mm)	8.5	6.6		13.2		18.8
Geometric standard deviation	3.77	3.84		3.20		1.59

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a/ Data taken from weekly composite.

Table B-[illegible]. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF AUGUST [illegible], 19[illegible]
(Production week [illegible])

	21 Mill discharge	22 Cyclone discharge	23 Storage bin discharge	25 Magnetic belt rejects	27 Magnetic drum rejects	28 Ferrous metal byproducts
Quantity (Mg)	188.1	113.2	270.8	31.6	0.5	18.1
Heating value (kJ/kg)	10,369	9,838		7,310	6,669	5,115
Bulk density (kg/m^3)	152	130		698	1,016	985
Moisture (wt. %)	23.55	29.70		20.80	0.26	0.11
Composition (wt. %)						
Paper	49.4	48.2		0.2	0	0
Plastic	6.0	5.0		1.1	0.1	0
Wood	7.9	6.2		6.1	0.1	0
Glass	2.1	1.9		31.5	0.2	0
Magnetic metal	0.1	0		13.3	93.8	99.6
Other metals	0.8	0.4		3.6	5.0	0.3
Organics	5.7	9.6		26.5	0.1	0
Miscellaneous	33.1	27.9		19.6	0.9	0.1
Chemical analysis (wt. %)						
Ash	17.52	13.66				
Fe (Fe_2O_3)[a]	0.68	0.32				
Al (Al_2O_3)[a]	1.18	0.58				
Cu (CuO)[a]	0.01	0.01				
Pb (PbO)[a]	0.06	0.02				
Ni (NiO)[a]	0.01	0.01				
Zn (ZnO)[a]	0.06	0.06				
Visual analysis (wt. %)						
Fe				1.60	26.05	16.18
Tin cans				16.16	62.76	83.02
Al				4.31	11.08	0.08
Cu				0.29	0.51	0
Size (mm)						
Percent larger than 50.8	0	0		0		0
Percent less than 50.8	100.0	100.0		100.0		100.0
Percent less than 38.1	100.0	99.6		97.2		100.0
Percent less than 19.1	82.7	95.6		65.6		55.4
Percent less than 9.5	60.2	65.0		28.1		7.0
Percent less than 4.8	38.0	46.1		11.3		0.7
Percent less than 2.4	21.9	26.9		4.7		0.2
Particle size						
Geometric mean diameter (mm)	6.9	5.7		13.0		17.5
Geometric standard deviation	3.19	2.51		2.17		1.56

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[a] Data taken from weekly composite.

Table B-122. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS AND CHARACTERISTICS FOR WEEK OF SEPTEMBER 1, 1975
(Production Week 43)

	01 Mill discharge	02 Cyclone discharge	03 Storage bin discharge	05 Magnetic belt rejects	07 Magnetic drum rejects	08 Ferrous metal by-products
Quantity (Mg)	968.9	833.1	833.1	81.3	1.0	33.0
Heating value (kJ/kg)	11,131	10,352		6,695	8,231	5,113
Bulk density (kg/m^3)	137	123		581	1,000	969
Moisture (wt. %)	28.83	31.13		15.50	0.22	0.25
Composition (wt. %)						
Paper	51.7	59.0		1.5	0	0
Plastic	5.6	5.6		1.8	0.1	0
Wood	1.9	3.3		5.1	0.1	0
Glass	5.8	4.8		30.5	0.3	0
Magnetic metal	7.3	0		9.9	81.5	99.5
Other metals	0.8	0.3		3.5	16.0	0
Organics	6.7	5.5		16.3	0.1	0
Miscellaneous	22.1	23.5		33.7	1.8	0.5
Chemical analysis (wt. %)						
Ash	17.15	18.23				
Fe (Fe$_2$O$_3$)[a]	0.56	0.50				
Al (Al$_2$O$_3$)[a]	1.50	1.51				
Cu (CuO)[a]	0.03	0.05				
Pb (PbO)[a]	0.08	0.05				
Ni (NiO)[a]	0.01	0.01				
Zn (ZnO)[a]	0.10	0.06				
Visual analysis (wt. %)						
Fe				5.01	17.83	15.06
Tin cans				30.95	71.35	83.41
Al				5.15	9.25	0.08
Cu				0.50	0.35	0
Size (mm)						
Percent larger than 63.5	0	0.5		0		0
Percent less than 63.5	100.0	99.5		100.0		100.0
Percent less than 38.1	98.5	98.2		88.9		99.6
Percent less than 19.1	73.6	81.2		53.1		55.5
Percent less than 9.5	48.3	53.7		28.2		11.0
Percent less than 4.8	37.3	46.5		7.5		1.2
Percent less than 2.4	20.9	28.3		3.3		0.3
Particle size						
Geometric mean diameter (mm)	8.1	6.2		15.6		16.9
Geometric standard deviation	2.77	3.01		2.16		1.66

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[a] Data taken from weekly composite.

Table 9-14a. SUMMARY OF PROCESSING PLANT MATERIAL FLOWS DURING PERIODS WHEN REFUSE SAMPLES NOT TAKEN
(Weekly summary - quantity Mg)

Week of production	Week of 1974 Month	Week of 1974 Day	S1 Raw refuse to mill	S2 Cyclone separator bottoms	S3 Storage bin discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
6	10	28	265.7	222.6	261.2	19.3	0.38a/	13.6
7	11	11	421.6	357.2	294.6	34.7	0.58a/	22.6
12	12	23	110.8	85.5	72.6	4.4	0.2	5.5
	(1975)							
33	6	9	87.0	72.6	0	8.4	0.2	4.3
34	6	16	85.1	67.1	62.6	5.9	0.1	5.8
35	6	23	86.9	67.1	62.6	11.5	0.1	5.4
39	7	21	53.4	40.3	121.9	4.3	0.1	1.8

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a/ Estimated value - material not weighed.

Table 8-34 HEATING VALUE OF MILLED REFUSE STREAMS, kJ/kg
(Received moisture basis)

Daily samples Date 1976 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S3 Storage bin discharge	S4 ADS heavies	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
9	23	11,765	11,188	11,317	6,166	5,291	6,022	5,135
9	24	9,660	11,560	11,028	5,867	6,160	7,615	5,177
9	25	10,345	10,789	10,187	5,881	5,957	7,031	5,176
9	26	10,970	11,587	11,639	5,521	7,378	7,784	5,262
9	27	10,786	11,738	12,390	6,661	6,983	6,676	5,193
Week avg		10,697	11,555	11,350	5,971	5,952	6,986	5,189
9	30	9,263	11,390	11,776	5,810	6,775	6,903	5,152
10	1	10,790	10,097	10,468	5,795	6,193	6,776	5,187
10	2	11,769	10,766	12,236	5,888	6,917	7,690	5,152
10	3	11,255	11,683	10,744	6,623	6,895	7,161	5,199
10	4	10,297	12,792	11,121	5,938	5,208	7,660	5,163
Week avg		10,805	11,368	11,269	6,011	6,398	7,158	5,171
10	7	11,866	12,596			5,356		6,092
10	8	12,085	12,155			5,108		5,071
10	9	13,153	13,613			6,136		5,088
10	10	12,953	13,339			4,292		5,196
10	11	12,620	12,928			6,923		5,012
Week avg		12,609	12,925			5,562		5,291
10	15	10,398	10,670			7,930		5,222
10	16	10,738	10,615			5,108		5,236
10	17	9,886	12,117			3,993		5,190
10	18	11,889	11,611			6,103		5,148
Week avg		10,728	11,253			5,851		5,199
10	21	10,766	11,040			8,857		5,115
10	22	10,672	12,269			6,655		5,128
10	23	12,925	12,608			8,561		5,081
10	24	13,055	13,192			7,635		5,511
10	25	10,258	12,693			5,848		5,125
Week avg		11,535	12,356			7,507		5,192
11	18	9,981	11,257			5,326	6,661	5,129
11	19	11,333	11,937			5,979	7,153	5,123
11	20	12,768	12,269			3,901	6,325	5,156
11	21	11,885	11,722			4,961	6,310	5,172
11	22	14,723	13,198			5,383	6,075	5,423
Week avg		12,138	12,071			5,106	6,506	5,201

Table 8-3a. (Continued)

Weekly composite (1974)	31 Mill discharge	32 Cyclone discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal by-products
11:25	11,778	12,890	8,030	6,655	5,200
12:2	10,177	11,983	6,908	6,273	5,163
12:9	12,606	16,049	5,600	6,639	5,211
12:30	10,789	11,659	5,898	6,111	5,239
(1975)					
1:6	6,678	13,717	3,760	6,211	5,208
1:13	12,757	11,915	5,706	6,367	5,255
1:20	16,573	16,260	6,065	6,752	5,213
1:27	10,232	13,339	5,953	7,672	5,206
2:3	11,962	11,833	5,068	6,668	5,353
2:10	10,277	11,775	6,656	6,033	5,195
2:17	11,558	13,121	5,866	7,630	5,109
3:3	11,300	12,636	5,098	5,532	5,158
3:10	12,288	12,261	4,356	6,869	5,281
3:17	11,251	10,388	10,830	6,271	4,653

Daily samples Date 1975 Month	Day					
3	21	11,325	10,567	7,353	6,607	4,994
3	24	10,973	10,996	5,382	6,925	5,272
3	25	10,876	11,633	6,665	6,892	5,763
3	27	13,608	10,813	4,377	7,510	5,056
3	28	9,835	9,786	6,160	6,883	5,236
3	29	9,735	10,897	5,662	7,050	5,223
Week avg		11,062	10,787	5,932	6,946	5,259
3	31	11,129	11,357	5,771	5,658	5,160
4	1	11,676	10,971	5,360	5,896	5,163
4	2	10,965	12,563	5,082	6,706	5,110
4	3	10,805	9,126	5,102	5,772	5,301
4	4	11,773	11,467	5,896	6,676	5,100
Week avg		11,265	11,096	5,538	6,301	5,171
4	7	9,762	11,712	6,605	7,003	5,070
4	8	10,723	11,771	5,772	6,410	5,180
4	9	11,737	10,669	5,661	6,383	5,196
4	10	11,121	11,689	4,978	6,833	5,200
4	11	10,386	12,766	4,776	6,966	5,066
4	12	9,730	10,381	5,637	5,693	5,170
Week avg		10,576	11,492	5,535	6,515	5,147

Table 8-1a. (Continued)

Daily samples Date 1979 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
6	11	10,620	11,520	6,127	6,037	5,222
6	12	8,766	11,283	6,060	6,062	5,154
6	16	10,173	11,018	[illegible]	[illegible]	[illegible]
Week avg		9,853	11,274	5,930	6,433	5,170
6	18a/	8,356	10,601	6,222	b/	b/
6	19a/	9,512	10,751	6,033	6,069	5,213
6	21a/	13,227	10,592	6,367	5,286	5,125
6	22a/	9,662	9,050	6,836	5,127	5,057
6	25a/	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		9,577	9,831	6,887	5,166	5,127
6	28	6,896	7,970	5,202	7,138	5,166
6	29	7,319	9,986	5,678	5,897	5,133
6	30	7,856	9,310	6,360	5,973	5,161
7	1	8,929	9,566	7,805	7,102	5,125
7	2	[illegible]	8,736	[illegible]	[illegible]	[illegible]
Week avg		8,018	9,210	6,036	6,677	5,127
7	6	8,789	9,813	5,368	5,106	5,020
Week avg		8,789	9,813	5,368	5,106	5,020
7	12	9,360	9,081	6,873	5,675	5,137
7	13	7,308	8,731	6,035	b/	b/
7	16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		8,536	9,236	5,903	6,376	5,139
7	19	10,207	9,836	7,786	5,552	5,157
7	20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		9,898	10,505	6,757	5,519	5,150
7	30	9,580	10,683	6,153	5,653	5,126
8	1	9,206	11,296	6,003	5,686	5,127
8	2	11,498	8,813	8,010	6,393	5,151
8	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		10,154	10,303	6,730	5,890	5,138
8	7	8,235	8,800	3,761	6,160	5,136
8	8	10,076	8,932	4,902	6,021	5,121
8	9	10,095	9,680	5,265	5,730	5,116
8	10	10,635	10,657	5,582	5,803	5,149
8	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		9,430	9,376	4,956	5,933	5,132

Table B-36. (Concluded)

Daily samples Date 1975 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
7	15	10,452	10,402	6,667	6,167	5,161
7	16	9,278	10,785	6,395	7,686	5,126
7	17	10,225	9,381	6,956	5,911	4,837
7	18	9,880	9,911	4,592	6,482	5,105
Week avg		9,958	10,120	6,151	6,562	5,057
7	30	10,432	9,700	6,702	7,649	5,123
8	1	10,986	10,176	6,104	6,103	5,118
Week avg		10,709	9,938	6,403	6,876	5,121
8	5	10,867	9,757	6,357	6,328	5,118
8	6	8,934	8,050	6,995	5,640	5,126
8	7	12,896	9,252	7,769	5,721	5,166
8	8	8,679	9,988	5,607	5,506	5,117
Week avg		10,344	9,262	6,682	5,798	5,132
8	11	10,608	8,170	8,957	6,431	5,167
8	14	9,052	8,985	7,491	5,585	5,136
8	15	8,893	10,078	6,526	5,691	5,115
Week avg		9,518	9,078	7,658	5,903	5,139
8	19	9,621	10,010	6,123	5,735	5,121
8	20	9,001	8,309	7,754	5,689	5,092
8	21	9,961	10,121	6,627	6,709	5,118
8	22	10,286	9,853	6,991	5,963	5,160
Week avg		9,718	9,575	6,874	6,025	5,123
8	28	9,354	9,758	6,697	7,714	5,128
8	29	11,164	9,917	7,922	5,424	5,142
Week avg		10,759	9,838	7,310	6,569	5,135
9	2	10,818	9,836	6,926	5,779	5,116
9	3	10,520	11,551	5,965	6,153	5,113
9	4	11,186	10,588	6,575	6,871	5,102
9	5	11,992	9,581	7,336	8,121	5,123
Week avg		11,131	10,387	6,695	6,731	5,114
Total average[c]		10,636	11,157	6,080	6,486	5,239

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[a] Fine grind.
[b] Huggertizer down.
[c] Average includes weekly composites November 25, 1974, through March 17, 1975.

Table 8-3b. BULK DENSITY OF MILLED REFUSE STREAMS, kg/m³
(Received moisture basis)

Daily samples Date Month	Daily samples Date Day	01 Mill discharge	02 Cyclone discharge	03 Storage bin discharge	04 ADS hoppers	05 Magnetic belt rejects	06 [illegible] feed	07 Magnetic drum rejects	08 Ferrous metal [illegible]
9	22	117	95	123	615	602	620	918	911
9	23	111	105	117	661	595	657	886	966
9	24	130	111	109	580	566	579	891	955
9	25	136	98	123	615	560	615	891	918
9	26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	30	151	130	136	630	588	569	950	950
10	1	122	111	163	631	516	607	913	950
10	2	135	103	152	607	526	580	887	896
10	3	136	109	136	599	555	665	915	966
10	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	7	130	101			596			965
10	8	117	90			606			986
10	9	83	90			571			595
10	10	111	90			596			1,009
10	14	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
10	15	151	121			567			950
10	16	121	102			530			932
10	17	135	91			537			1,025
10	18	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
10	21	123	90			539			1,091
10	22	109	83			620			1,061
10	23	90	71			533			953
10	24	105	83			613			1,001
10	25	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
11	18	123	83			600		937	888
11	19	111	77			553		937	925
11	20	90	77			656		1,066	975
10	21	107	77			620		1,059	869
10	22	[illegible]	[illegible]			[illegible]		[illegible]	[illegible]
Week avg		[illegible]	[illegible]			[illegible]		[illegible]	[illegible]

Table 8-3b. (Continued)

Weekly composites (1974)		51 Mill discharge	52 Cyclone discharge	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal byproducts
11-25		96	81	738	991	988
12-2		123	71	683	950	916
12-9		85	58	658	937	903
12-30		99	80	594	1,014	899
(1975)						
1-6		105	95	633	1,019	931
1-13		71	83	711	1,001	1,033
1-20		77	83	703	1,020	995
1-27		130	105	607	983	936
2-3		111	65	628	1,033	988
2-10		123	77	711	1,001	918
2-17		90	59	679	1,067	1,159
3-3		130	77	775	1,036	960
3-10		101	77	655	1,015	982
3-17		117	81	586	1,055	1,009
Daily samples						
Date 1975						
Month	**Day**					
3	24	136	70	685	1,033	905
3	25	113	77	678	1,059	982
3	26	93	83	753	966	1,020
3	27	130	111	823	966	956
3	28	151	96	678	1,063	1,059
3	29	152	86	752	1,208	1,028
Week avg		129	87	728	1,049	1,000
3	31	105	90	815	1,050	1,008
4	1	117	83	666	955	956
4	2	98	90	753	1,052	976
4	3	93	119	766	1,027	913
4	4	91	81	801	1,183	1,150
Week avg		101	93	755	1,053	1,001
4	7	103	90	652	1,015	905
4	8	133	90	753	1,027	1,027
4	9	111	98	737	1,001	915
4	10	98	71	690	1,183	1,008
4	11	102	90	708	1,067	977
4	12	111	82	718	1,112	1,040
Week avg		111	87	708	1,065	979

Table B-15. (Continued)

Daily samples Date 1975 Month	Day	31 Mill discharge	32 Cyclone discharge	33 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal byproducts
6	11	117	90	633	1,125	937
6	13	117	90	562	1,125	953
6	18	133	95	620	1,052	963
Week avg		122	92	605	1,101	951
6	16a/	131	130	816	b/	b/
6	17a/	111	104	705	1,136	1,357
6	18a/	123	127	601	1,108	1,169
6	19a/	137	123	812	1,395	1,253
6	20a/	142	118	840	1,408	1,183
Week avg		128	119	755	1,175	1,290
6	26	138	111	726	1,008	912
6	27	162	123	769	1,085	878
6	30	175	111	725	1,033	891
7	1	136	104	639	1,083	891
7	2	162	142	550	1,057	983
Week avg		153	120	681	1,057	911
7	8	182	123	582	1,230	1,136
Week avg		129	123	576	1,230	1,136
7	12	175	122	611	935	983
7	13	181	168	750	b/	b/
7	16	162	142	388	1,086	1,008
Week avg		173	157	607	1,055	980
7	19	104	111	650	1,163	944
7	20	132	128	543	1,112	1,033
Week avg		117	121	597	1,138	989
7	30	143	130	571	1,059	769
8	1	123	101	690	1,106	937
8	2	91	95	571	1,001	865
8	3	142	128	628	1,013	862
Week avg		125	107	615	1,059	858
8	7	133	136	633	1,101	985
8	8	151	157	590	916	935
8	9	123	113	673	1,014	891
8	10	173	107	536	903	937
8	11	153	111	607	1,098	863
Week avg		147	127	599	989	938

Table B-36. (Concluded)

Daily sample Date 1977 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S3 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
7	15	152	102	569	1,001	901
7	16	183	88	775	1,001	931
7	17	113	77	711	1,059	1,085
7	18	125	104	582	953	900
Week avg		151	105	659	1,008	958
7	30	123	102	678	903	931
8	1	117	117	588	1,122	902
Week avg		120	110	633	988	918
8	5	121	136	556	891	911
8	6	168	136	665	961	886
8	7	173	151	567	1,001	918
8	8	153	142	604	1,033	935
Week avg		159	135	598	972	918
8	11	155	123	582	971	918
8	12	156	168	587	1,059	955
8	13	153	188	714	1,060	953
Week avg		155	160	635	1,027	942
8	19	159	130	616	1,020	905
8	20	167	123	607	982	918
8	21	123	123	607	1,020	1,001
8	22	167	106	584	1,040	944
Week avg		154	120	603	1,016	941
8	28	168	149	652	931	951
8	29	136	111	542	1,092	1,042
Week avg		152	130	598	1,016	996
9	2	151	130	517	1,078	993
9	3	163	102	616	1,008	956
9	4	117	117	612	918	931
9	5	90	135	563	983	933
Week avg		130	121	587	1,060	929
Total averages[c]		133	99	636	1,033	980

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[a] Fine grind.
[b] [illegible] down.
[c] Average includes weekly composites November 25, 1976, through March 17, 1977.

Table 6-31. MOISTURE ANALYSIS OF MILLED REFUSE STREAMS, WT %

Daily samples Date 1975 Month	Day	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	34 ADS heavies	41 Magnetic belt rejects	35 Supplemental fuel	37 Magnetic drum rejects	39 Ferrous metal by-products
9	11	20.60	27.10	28.80	8.00	32.80	0.10	10.50	0.10
9	16	31.00	26.30	31.10	7.60	12.30	0.60	0.60	0.60
9	23	31.90	31.80	31.60	6.70	28.10	0.50	1.30	0.20
9	25	17.50	17.80	25.90	5.87	12.60	0.31	0.16	0.26
9	12	28.80	33.30	33.60	1.10	18.10	0.62	0.08	0.12
Week avg		27.90	27.26	27.76	5.57	19.56	0.79	2.75	0.26
9	30	32.30	28.80	25.20	0.32	12.00	0.15	0.11	0.15
10	1	32.00	31.00	33.00	7.30	17.90	0.30	0.70	7.10
10	2	23.90	29.50	25.60	4.80	17.00	0.60	0.50	0.10
10	3	18.00	24.50	27.00	1.30	15.70	0.50	0.51	0.20
10	6	22.20	32.00	25.10	3.10	4.40	0.00	0.40	0.02
Week avg		25.69	29.30	26.86	4.10	13.81	0.35	0.36	0.17
10	7	15.60	17.00			8.20			0.07
10	8	16.70	25.10			13.10			0.10
10	9	19.50	23.90			16.70			0.06
10	15	17.60	18.70			17.00			0.10
10	13	13.30	19.30			8.92			0.13
Week avg		17.55	18.75			12.00			0.09
10	15	30.10	11.80			24.20			0.11
10	16	17.60	32.90			16.50			0.16
10	17	26.30	25.10			15.50			0.16
10	18	13.80	32.40			15.00			0.12
Week avg		21.80	28.96			16.74			0.16
10	21	21.90	23.70			7.60			0.10
10	22	21.70	23.10			11.30			0.30
10	23	17.60	22.50			15.50			3.00
10	24	10.10	15.10			17.50			0.14
10	25	13.80	16.10			11.10			0.10
Week avg		18.95	20.00			13.02			0.71
11	18	15.50	27.70			13.20		0.31	0.00
11	19	13.20	22.10			16.70		0.29	0.13
11	20	20.50	25.50			15.00		0.26	0.13
11	21	18.30	23.00			15.50		0.19	0.07
11	22	7.10	31.10			18.80		0.04	0.08
Week avg		18.71	25.90			15.85		0.21	0.09

Table B-3c. (Continued)

Weekly composite (1974)		51 Mill discharge	52 Cyclone discharge	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products
11-25		20.20	17.60	16.90	0.26	0.08
12-2		21.50	26.50	19.60	0.15	0.06
12-9		22.90	11.90	16.30	0.13	0.27
12-30		31.20	28.70	17.00	0.26	0.16
(1975)						
1-6		20.90	13.60	6.90	0.07	0.08
1-13		21.20	28.10	10.60	0.23	0.11
1-20		9.3	7.92	7.56	0.05	0.03
1-27		19.90	17.80	6.93	0.58	0.13
2-3		21.70	26.60	17.10	0.22	0.18
2-10		19.20	17.80	16.10	0.16	0.03
2-17		21.50	18.50	12.00	0.08	0.07
3-3		17.90	23.50	9.50	0.03	0.12
3-10		20.50	26.00	13.90	0.07	0.16
3-17		20.80	27.15	0.11a/	1.18	16.60a/
Daily samples						
Date 1975						
Month	**Day**					
5	22	19.20	20.80	16.50	0.05	0.05
5	23	13.80	16.40	9.56	0.10	0.06
5	26	18.80	18.70	17.60	0.13	0.65
5	27	26.80	33.00	16.20	1.86	0.09
5	28	27.60	28.90	25.10	0.38	0.07
5	29	30.80	31.50	10.80	0.28	0.02
Week avg		22.67	25.22	15.29	0.66	0.15
5	31	22.90	25.30	16.70	0.01	0.11
6	1	13.70	21.00	11.10	0.06	0.18
6	2	13.00	19.50	13.00	0.17	0.69
6	3	19.30	19.60	8.17	0.21	0.06
6	4	11.10	15.70	10.10	0.14	0.08
Week avg		19.65	20.22	12.21	0.11	0.18
6	7	18.50	18.20	17.50	0.18	1.02
6	8	11.80	17.50	10.80	0.11	0.18
6	9	16.60	18.50	17.70	0.02	0.01
6	10	18.00	17.60	13.70	0.01	0.01
6	11	19.70	1.25	9.59	0.06	0.03
6	12	18.62	18.20	8.81	0.06	0.11
Week avg		17.67	15.36	13.02	0.08	0.23
6	14	21.30	20.30	18.00	0.09	0.08
6	15	23.30	26.60	17.20	0.07	0.15
6	16	23.60	21.10	11.70	0.10	0.10
Week avg		22.73	22.67	15.97	0.09	0.11

Table B-3c. (Continued)

Daily samples date 1978 Month	Day	51 Mill discharge	61 Cyclone discharge	65 Magnetic belt rejects	67 Magnetic drum rejects	68 Ferrous metal by-products
4	18b/	29.45	23.50	3.07	a/	a/
4	19b/	29.05	22.50	7.61	0.00	0.13
4	21b/	15.90	26.30	11.20	0.06	0.02
4	22b/	18.40	16.50	5.56	1.06	0.10
4	24b/	31.60	36.70	8.41	3.20	0.15
Week avg		24.88	25.10	7.17	1.08	0.10
4	26	29.10	30.20	12.70	0.16	0.08
4	29	32.20	28.70	13.50	0.11	0.05
4	30	35.30	33.90	17.50	0.67	0.13
5	1	31.10	29.10	16.30	0.13	0.19
5	2	32.00	33.50	11.30	0.61	0.02
Week avg		31.94	31.08	14.26	0.33	0.09
5	9	30.90	30.60	11.70	0.12	0.18
Week avg		30.90	30.60	11.70	0.12	0.18
5	12	28.20	31.10	17.20	0.25	0.39
5	13	33.70	36.50	13.50	a/	a/
5	16	31.80	33.30	21.20	0.38	0.03
Week avg		31.23	33.63	17.30	0.32	0.21
5	19	18.60	25.60	10.20	0.06	0.03
5	20	22.40	19.40	10.10	0.01	0.01
Week avg		20.50	22.50	10.15	0.04	0.02
6	30	20.20	29.60	23.80	0.15	0.18
7	1	19.90	18.80	7.57	0.09	0.12
7	2	20.80	25.90	11.00	0.16	0.25
7	3	22.60	20.60	12.90	0.78	0.17
Week avg		20.88	23.73	13.82	0.30	0.18
7	7	34.80	36.20	16.10	0.39	0.26
7	8	31.30	34.00	22.80	0.17	0.30
7	9	32.90	32.20	11.60	0.13	0.08
7	10	25.90	25.60	16.90	0.20	0.13
7	11	34.20	33.10	12.10	0.18	0.13
Week avg		31.82	32.58	15.90	0.21	0.18
7	15	26.70	27.60	19.50	0.16	0.16
7	16	28.90	25.10	9.06	0.66	0.23
7	17	22.20	16.50	6.83	0.08	0.21
7	18	33.50	33.00	12.30	0.28	0.17
Week avg		27.83	25.55	11.92	0.29	0.19

Table B-3c. (Concluded)

Daily samples Date 1975 Month	Day	#1 Mill discharge	#2 Cyclone discharge	#5 Magnetic belt rejects	#7 Magnetic drum rejects	#8 Ferrous metal by-products
7	30	27.60	31.60	15.60	0.63	0.08
8	1	31.20	29.80	15.90	0.12	0.11
Week avg		29.40	30.65	15.75	0.38	0.10
8	5	19.70	37.10	21.90	0.19	0.18
8	6	36.10	39.90	27.20	0.17	0.09
8	7	20.50	33.90	17.00	0.09	0.13
8	8	33.00	33.50	16.60	0.20	0.16
Week avg		27.33	36.10	20.63	0.16	0.14
8	11	28.60	27.80	23.10	0.16	0.26
8	14	33.70	30.60	20.70	0.09	0.12
8	15	30.80	30.50	16.70	0.25	0.22
Week avg		30.97	29.70	20.17	0.16	0.20
8	19	30.80	36.90	20.60	0.12	0.25
8	20	40.10	42.20	25.80	0.33	0.63
8	21	36.00	31.30	15.80	0.35	0.20
8	22	33.00	37.90	13.50	0.08	0.10
Week avg		34.43	38.37	18.98	0.22	0.30
8	28	35.60	39.10	23.00	0.47	0.27
8	29	31.90	40.20	18.60	0.05	0.06
Week avg		33.65	39.70	20.80	0.26	0.16
9	2	32.30	35.60	16.80	0.08	0.12
9	3	26.40	31.30	16.10	0.25	0.31
9	4	31.10	35.60	16.70	0.61	0.35
9	5	25.80	36.20	12.00	0.09	0.12
Week avg		28.81	34.13	15.40	0.27	0.23
Total average[d]		26.53	25.25	13.75	0.33	0.53

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a/ No reason found for unusually low #5 moisture content and unusually high #8 moisture content. Plant operated only 1 day during week of March 17 after several days of maintenance. Maintenance may have left debris in process line which appeared in #8 and #5 samples.

b/ Fine grind.

c/ Hoggotizer down.

d/ Average includes weekly composites November 11, 1974, through March 17, 1975.

Table 9-32. ANALYSIS OF MILLED REFUSE STREAMS PAPER BY VISUAL ANALYSIS, wt. %
(As-received moisture basis)

Daily samples Date 1976 Month	Day	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	34 ADS heavies	35 Magnetic belt rejects	36 Nuggetizer feed	37 Magnetic drum rejects	38 Ferrous metal by-products
9	21	57.0	61.5	59.3	1.7	2.5	0	0	0
9	22	56.9	53.7	57.9	0.8	8.3	tr	0	0
9	23	63.7	39.7	50.7	0.5	5.7	0	0	0
9	26	57.6	63.9	68.0	0.6	6.0	0	0	0
9	27	51.6	63.9	73.3	1.0	5.6	0	0.6	0
Week avg		57.0	58.9	67.0	1.0	5.9	tr	0.1	0
9	30	52.0	53.9	69.0	3.0	0.8	0.6	tr	0
10	1	65.9	65.6	66.3	1.8	6.1	tr	tr	0
10	2	61.5	55.3	63.5	0.5	3.6	0	0	3
10	3	73.7	56.8	65.0	3.6	9.6	0.1	0	0
10	5	72.0	66.3	61.3	1.0	3.0	tr	tr	0
Week avg		67.5	59.3	66.6	2.0	5.6	0.1	tr	0
10	7	57.5	62.5			9.6			tr
10	8	56.8	65.3			9.3			0
10	9	68.7	70.6			9.5			0
10	10	70.7	60.5			3.7			tr
10	11	66.6	48.3			3.3			0
Week avg		59.9	57.6			6.8			tr
10	15	38.3	52.5			9.7			0
10	16	53.5	55.6			9.0			0
10	17	50.9	67.3			22.0			0
10	18	63.2	48.8			8.8			0
Week avg		51.2	53.5			12.3			0
10	21	63.6	56.7			5.5			0
10	22	61.7	52.6			10.8			0
10	23	23.6	61.1			5.7			0
10	25	53.8	55.7			10.3			0
10	26	59.0	61.6			1.8			0
Week avg		58.3	57.5			7.9			0
11	18	58.3	70.3			1.3		0	0
11	19	75.5	31.8			6.6		0	0
11	20	77.5	68.3			1.7		0	0
11	21	73.3	66.7			5.7		0	tr
11	22	63.0	58.8			3.2		0	0
Week avg		55.3	63.7			3.8		0	tr

Table B-34. (Continued)

Weekly composite (1974)		11 Mill discharge	12 Cyclone discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal byproducts
11-25		74.5	59.9	7.0	0	0
12-2		67.6	88.0	5.0	0	0
12-9		85.0	85.1	12.8	0	Tr
12-30		63.0	86.5	10.6	0	0
(1975)						
1-6		55.3	66.3	1.0	Tr	0
1-13		56.0	86.9	0.1	0	0.1
1-20		57.1	65.5	0.6	0	0
1-27		57.9	62.0	0.8	Tr	0
2-3		69.6	75.2	1.1	0	0
2-10		70.9	67.6	0.1	Tr	Tr
2-17		57.6	70.8	0	0	0
3-3		56.2	71.2	Tr	0	0
3-10		65.5	78.7	1.3	0	0
3-17		53.1	70.3	0	0	0
Daily samples Date 1975						
Month	**Day**					
1	24	50.8	58.5	0	0	0
1	25	59.6	57.9	1.7	0	0
1	26	61.0	35.9	0.05	0	0
1	27	63.5	61.7	0.3	0	0
1	28	61.3	57.6	5.6	0	0
1	29	58.0	51.6	0	0	0
Week avg		58.5	57.3	1.7	0	0
1	31	68.5	68.8	0.5	0	0
2	1	66.1	61.5	1.2	0	0
2	2	57.1	53.6	0	0	0
2	3	55.1	60.1	0	0	0
2	4	58.0	62.8	0	0	0
Week avg		60.1	58.5	Tr	0	0
2	7	51.6	63.7	0	0	0
2	8	51.9	75.2	0.1	0	0
2	9	56.9	69.1	0	0	0
2	10	66.5	60.5	0.3	0	0
2	11	65.0	58.3	Tr	0	0
2	12	58.2	73.1	0	0	0
Week avg		58.5	68.8	0.1	0	0

Table 8-14. (Continued)

Daily samples Date 1975 Month	 Day	31 Mill discharge	32 Cyclone discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal by-products
6	14	52.8	50.1	0	0	0
6	15	58.0	63.8	1.7	0	0
6	16	59.2	74.2	0.1	0	0
Week avg		56.7	62.7	0.6	0	0
6	18a/	56.1	63.6	0.8	b/	b/
6	19a/	68.6	68.0	0	0	0
6	21a/	63.2	63.7	1.6	0	0
6	22a/	52.7	69.7	0.6	0	0
6	23a/	25.0	33.1	0	0	0
Week avg		53.3	58.0	0.5	0	0
6	28	36.6	36.9	0.2	0	0
6	29	39.5	59.9	1.7	0	0
6	30	36.0	58.5	0.7	0	0
7	1	53.6	69.2	0.1	0	0
7	2	37.3	60.3	0.1	0	0
Week avg		40.6	57.0	0.6	0	0
7	3	50.3	55.7	0.3	0	0
Week avg		50.3	55.7	0.3	0	0
7	16	38.7	38.7	1.6	0.1	0
7	17	62.9	56.6	0.3	b/	b/
7	18	47.2	28.9	5.1	14	0
Week avg		53.1	41.3	2.3	14	0
7	19	56.2	67.9	0.6	0	0
7	20	56.5	48.8	0.4	0	0
Week avg		56.3	58.3	0.5	0	0
6	30	53.5	50.1	8.9	0	0
7	1	57.7	65.3	0.2	0	0
7	2	49.2	76.1	0.3	0	0
7	3	50.3	73.2	0	0	0
Week avg		57.8	66.8	2.4	0	0
7	7	53.9	63.2	1.8	0	0
7	8	37.9	71.8	0.7	0	0
7	9	56.3	56.2	0.1	0	0
7	10	53.9	66.9	0.3	0	0
7	11	61.2	65.0	0.1	0	0
Week avg		57.1	67.0	0.6	0	0

Table B-34. (Concluded)

Daily samples, Date 1975 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal [illegible]
7	15	58.8	67.1	2.7	Tr	Tr
7	16	60.3	56.5	0.1	0.1	0
7	17	59.5	58.5	0.2	0.3	0.1
7	18	55.2	57.2	0.2	0.1	0
Week avg		57.6	57.5	0.7	0.1	Tr
7	30	50.7	68.5	0.3	0.1	0
8	1	52.0	48.2	4.8	0	0
Week avg		50.9	58.6	2.5	0.1	0
8	5	53.1	53.5	0.2	0	0
8	6	57.9	66.0	3.6	0	0
8	7	61.8	58.8	0.6	0	0
8	8	58.7	58.3	0.2	0	0
Week avg		57.8	59.6	1.1	0	0
8	11	56.5	58.6	0.2	0	0
8	12	57.0	53.9	0.3	0	0
8	13	59.0	55.8	0.2	0	0
Week avg		57.5	55.9	0.2	0	0
8	19	58.9	59.5	0.1	0.1	0
8	20	55.3	57.0	1.8	0	0
8	21	58.0	55.3	0.3	0	0
8	22	55.5	51.6	0.2	Tr	0
Week avg		57.7	57.1	0.6	Tr	0
8	28	50.5	58.7	0.2	Tr	0
8	29	48.5	51.5	0.1	0	0
Week avg		49.5	58.9	0.2	0	0
9	2	57.2	61.7	1.1	0.1	0
9	3	50.0	50.9	3.5	Tr	0
9	4	55.1	65.8	0.7	0	0.1
9	5	53.3	58.5	0.6	0	0
Week avg		53.7	59.0	1.5	0	0
Total average[c]		55.1	57.8	2.5	0.01	Tr

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a/ Fire prior.
b/ Magnetizer down.
c/ Average includes weekly composites November 25, 1974, through March 17, 1975.

Table B-36. ANALYSIS OF MILLED REFUSE STREAMS PLASTIC BY VISUAL ANALYSIS, wt. %
(Received moisture basis)

Daily samples Date 1976 Month	Day	01 Mill discharge	02 Cyclone discharge	03 Storage bin discharge	04 ADS heavies	05 Magnetic belt rejects	06 Nuggetizer feed	07 Magnetic drum rejects	08 Ferrous metal by-products
9	23	7.8	2.6	1.8	0	1.0	0.2	0	0
9	24	6.4	5.3	6.0	0.7	4.9	0.1	0.7	0
9	25	12.5	4.8	16.5	1.5	1.1	0	0.5	0
9	26	9.5	5.1	9.9	1.0	5.1	0	0.2	0
9	27	3.7	2.0	1.8	0	2.1	0	0.7	0
Week avg		8.0	3.9	6.8	0.6	2.8	0.1	0.5	0
9	30	3.9	7.5	3.9	0.5	1.5	tr	tr	0
10	1	2.2	3.6	7.1	3.5	0.9	0	0	0
10	2	2.1	6.5	11.7	0	6.0	0	0	0
10	3	7.0	1.5	3.8	2.2	1.8	0	0.2	0
10	4	3.8	10.8	6.5	tr	3.6	tr	0.8	0
Week avg		4.1	5.9	6.1	1.2	2.3	tr	0.2	0
10	7	5.6	12.1			9.0			0
10	8	13.8	3.1			1.7			0
10	9	1.7	2.6			8.0			0
10	10	9.9	5.0			10.8			0.3
10	11	5.8	4.7			3.3			0
Week avg		7.6	5.7			6.5			0.06
10	15	3.6	3.7			3.7			0
10	16	1.3	4.9			7.8			0
10	17	2.1	8.1			1.7			tr
10	18	3.3	3.3			3.0			0
Week avg		2.5	5.5			4.2			0
10	21	1.7	0.2			0.8			0.3
10	22	11.5	5.5			0			0
10	23	10.6	7.1			9.0			0
10	24	5.7	3.7			12.6			0
10	25	3.3	3.3			0.8			0
Week avg		6.6	4.0			4.5			0.1
11	18	8.1	8.7			3.3		0	0
11	19	6.0	5.8			13.7		0	0
11	20	8.2	8.0			1.0		3.3	0
11	21	3.1	10.3			0.6		0.2	tr
11	22	4.3	3.6			0.3		0.4	0
Week avg		5.0	7.3			3.8		0.7	tr

Table 5-18. (Continued)

Weekly composite (1974)	#1 Mill discharge	#2 Cyclone discharge	#5 Magnetic belt rejects	#7 Magnetic drum rejects	#8 Ferrous metal byproducts
11-25	10.6	6.7	2.7	0.3	0
12-2	2.8	3.0	0	0.1	0.1
12-9	7.6	5.0	0.5	1.3	0.2
12-30	7.2	6.7	1.8	0.7	0
(1975)					
1-6	3.0	16.1	1.0	0.2	0
1-13	6.6	2.3	0.8	0.5	tr
1-20	4.2	1.9	0.9	0.3	0
1-27	8.5	2.5	1.3	0	0
2-3	2.6	3.2	tr	0.1	0
2-10	1.8	6.6	0.2	0.1	tr
2-17	5.1	5.0	tr	0.2	0
3-3	5.1	8.2	0.6	0.4	0
3-10	4.5	2.6	1.2	0.3	0
3-17	12.5	5.1	0.7	0.8	0
Daily samples Date 1975					
Month Day					
3 24	2.5	7.6	0	1.0	0
3 25	3.3	3.6	1.5	0.1	0
3 26	7.5	26.7	0.15	4.5	0
3 27	5.7	5.9	3.2	0.9	0
3 28	8.2	4.5	3.7	0.6	tr
3 29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg	5.1	7.5	1.5	0.9	0
3 31	1.9	5.6	2.2	0.1	0
4 1	1.5	3.2	0.6	0.2	0
4 2	2.5	7.7	2.1	0.2	0
4 3	3.2	16.6	2.0	0.3	0
4 4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg	2.9	5.9	2.5	0.2	0
4 7	3.0	3.5	0.7	1.8	0
4 8	3.3	8.2	0.8	0.5	0
4 9	5.4	5.0	0.3	0	0
4 10	5.5	7.2	3.5	0.2	0
4 11	3.7	3.3	1.9	0	0
4 12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg	3.5	5.6	1.7	0.5	0

Table B-16. (Continued)

Daily samples Date 1971 Month	Day	11 Mill discharge	12 Cyclone discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal byproducts
5	14	12.1	5.7	1.6	0.5	0
5	15	9.3	7.9	0.6	0.7	tr
5	16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		9.9	5.6	1.0	0.5	tr
5	18a/	7.6	7.6	[illegible]	a/	a/
5	19a/	7.5	6.5	0.5	0.1	0
5	21a/	[illegible]	9.2	5.3	tr	0
5	22a	5.1	6.1	0.6	0	0
5	23a/	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		7.7	7.8	1.6	tr	0
5	28	5.5	1.3	2.6	1.0	0
5	29	7.0	8.0	1.5	.7	0
5	30	7.5	8.9	1.5	0	0
6	1	5.7	6.0	1.1	0.3	0
6	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		7.1	7.7	1.6	0.5	0
6	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		7.1	5.7	0.7	0.3	0
6	11	7.2	5.3	0.2	0.1	0
6	13	5.1	5.1	1.6	a/	a/
6	16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		7.9	5.0	0.7	0.3	0
6	19	5.8	9.8	1.5	tr	0
6	20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		7.9	7.9	1.8	0.3	0
6	30	5.3	5.2	2.6	0.1	0
7	1	5.7	7.8	1.1	tr	0
7	2	7.3	5.7	0.3	0.5	0
7	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		7.1	7.5	1.6	0.3	0
7	7	5.5	5.5	1.9	0.2	0
7	8	7.8	7.0	0.1	0	0
7	9	5.5	5.6	0.6	0.2	0
7	10	5.7	7.5	1.0	0.3	0
7	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		7.3	7.1	1.2	0.3	0

Table 6-36. (Concluded)

Daily samples Date 1975 Month	Day	31 [illegible] discharge	32 Cyclone discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal byproducts
7	15	1.8	7.9	0.2	0.5	0
7	16	1.7	4.5	1.9	0.5	0
7	17	2.3	6.7	tr	0.6	tr
7	18	3.2	11.8	1.6	0.5	0
Week avg		2.1	7.8	1.0	0.6	0
7	30	3.2	7.5	1.0	0.8	0
8	1	4.0	6.8	1.0	0.2	0
Week avg		3.6	7.1	1.0	0.5	0
8	5	1.3	2.9	1.1	0.5	0
8	6	3.3	9.6	0.1	0.1	0
8	7	3.5	3.1	0.3	0.1	0
8	8	4.8	6.2	1.6	0.2	0
Week avg		3.5	5.8	1.0	0.3	0
8	11	5.5	5.3	1.6	0.6	0
8	12	6.3	4.2	0.1	0.7	0
8	13	2.8	8.4	1.0	tr	0
Week avg		4.9	5.9	0.9	0.3	0
8	19	11.7	7.7	1.2	0.3	0
8	20	6.2	4.8	1.0	0.3	0
8	21	5.3	5.0	1.7	tr	0
8	22	4.8	3.2	0.2	0.3	0
Week avg		6.7	5.1	1.1	0.2	0
8	28	8.3	5.5	1.3	0.2	0
8	29	3.3	4.2	0.8	0	0
Week avg		5.8	4.8	1.1	0.1	0
9	2	7.5	3.0	1.8	0.3	0
9	3	2.6	12.7	1.3	0.8	0
9	4	8.6	5.3	1.1	0.7	0
9	5	4.2	4.0	1.8	0.2	0
Week avg		5.6	6.6	1.5	0.5	0
Total averages[c]		5.3	5.8	1.0	0.37	0.01

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[a] Fine grind.
[b] Magnetizer drum.
[c] Average includes weekly composites November 25, 1974, through March 17, 1975.

Table B-31. ANALYSIS OF MILLED REFUSE STREAMS WOOD BY VISUAL ANALYSIS, wt. %
(Received moisture basis)

Daily samples Date 1976 Month	Day	11 Mill discharge	12 Cyclone discharge	13 Storage bin discharge	14 ADS heavies	15 Magnetic belt rejects	16 Nuggetizer feed	17 Magnetic drum rejects	18 Ferrous metal byproducts
9	23	0.9	0.9	3.5	2.6	7.5	0	0	0
9	24	7.9	1.6	3.5	0.3	6.9	0	0.1	0
9	25	1.0	5.3	1.5	6.0	5.0	0	5.6	0
9	26	trace	1.9	1.6	5.3	2.1	0	0	0
9	27	2.6	0.0	0.6	0	5.0	0	0.1	0
Week avg		1.5	2.1	2.1	3.6	5.3	0	1.0	0
9	30	2.9	1.1	3.1	5.8	2.9	0	11	0
10	1	9.1	0	0.3	5.0	16.1	0	0	0
10	2	1.7	1.3	1.5	2.3	16.0	0	1.2	0
10	3	6.6	2.9	5.3	0.6	5.5	0	0.6	0
10	4	3.3	2.8	3.8	1.0	12.2	0	0	0
Week avg		7.7	2.0	2.6	2.9	11.3	0	0.3	0
10	7	2.8	1.1			1.3			0
10	8	2.7	1.6			15.1			0
10	9	1.6	2.6			3.5			0
10	10	2.7	5.1			16.7			0
10	11	3.2	2.2			5.0			0
Week avg		2.1	3.1			8.3			0
10	15	15.1	2.5			3.7			0
10	16	3.8	1.2			6.6			0
10	17	0.8	3.0			23.0			0
10	18	2.0	2.1			26.2			0
Week avg		5.5	1.5			14.6			0
10	21	3.0	11			3.0			0
10	22	2.2	7.1			5.5			0
10	23	3.7	7.1			6.1			0
10	24	0	1.5			2.5			0
10	25	2.6	6.2			8.2			0
Week avg		2.2	7.1			5.8			0
11	18	0	0			0.3		0.6	0
11	19	0.8	0			3.0		0	0
11	20	11.5	1.8			4.0		0	0
11	21	7.3	6.7			20.3		0	0
11	22	3.2	1.8			3.2		1.2	0
Week avg		5.8	2.1			6.5		0.5	0

Table B-3f. (Continued)

Weekly composite (1974)		#1 Mill discharge	#2 Cyclone discharge	#5 Magnetic belt rejects	#7 Magnetic drum rejects	#8 Ferrous metal by-products
11-25		2.7	2.7	10.3	0	0
12-2		0.6	tr	0	0	0
12-9		0	0.5	0.1	0.1	0
12-30		2.5	2.5	13.8	0	0
(1975)						
1-6		3.7	1.0	2.3	0.5	0
1-13		0.3	0.7	1.1	0.3	0
1-20		3.8	1.7	1.9	0	0
1-27		0.2	1.3	0.7	0	0
2-3		3.3	0.6	0	0	0
2-10		0.7	0.6	2.3	0	0
2-17		0.6	0.5	0	0	0
3-3		5.1	0.9	1.0	tr	0
3-10		0.8	0.6	0.6	0	0
3-17		5.2	3.1	6.3	0.1	0
Daily samples Date 1975						
Month	Day					
3	14	1.1	3.7	5.8	0.1	0
3	15	1.6	2.6	3.3	0.1	0
3	16	1.8	2.3	3.5	0.9	0
3	17	1.3	1.2	1.6	0.3	0
3	18	0	1.9	1.6	0.7	0
3	19	[illegible]	[illegible]	[illegible]	tr	0
Week avg		1.1	2.2	3.1	0.4	0
3	31	3.3	0	0.5	0	0
4	1	1.9	1.0	3.5	0.2	0
4	2	1.0	0.6	1.2	0.1	0
4	3	0.8	0.2	1.5	0	0
4	4	[illegible]	[illegible]	[illegible]	0	0
Week avg		1.7	1.5	1.8	0.1	0
4	7	3.2	1.8	10.9	0.9	0
4	8	2.5	0.3	2.8	0	0
4	9	2.5	0.7	0.5	0	0
4	10	5.0	0.5	1.7	0	0
4	11	1.5	5.6	5.8	0	0
4	12	[illegible]	[illegible]	[illegible]	[illegible]	0
Week avg		2.7	2.0	3.7	0.1	0

Table B-11. (Continued)

Daily samples Date 1973 Month	Day	41 Mill discharge	42 Cyclone discharge	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products
6	14	3.9	8.1	3.0	0	0
6	15	1.0	0.7	6.6	0	0
6	16	10.6	0.0	0.8	tr	0
Week avg		6.7	4.7	3.6	tr	0
6	19a/	2.6	3.6	3.8	b/	b/
6	21a/	1.6	3.3	3.6	0.2	0
6	22a/	1.2	1.8	5.8	0.2	0
6	23a/	1.6	3.3	1.7	0	0
6	24a/	4.9	3.4	3.3	tr	0
Week avg		2.2	3.0	3.6	0.1	0
6	28	4.0	1.1	5.8	0.1	0
6	29	3.3	2.3	0.7	tr	0
6	30	6.3	1.7	3.1	tr	0
7	1	2.9	6.7	3.6	tr	0
7	2	10.6	8.0	10.2	0.4	tr
Week avg		5.0	3.7	4.9	0.1	tr
7	3	0.1	6.9	3.3	0	0
Week avg		0.1	6.9	3.3	0	0
7	11	5.1	6.1	0.1	0	0
7	12	5.7	1.0	3.3	b/	b/
7	16	10.4	3.6	3.2	0.4	0
Week avg		8.0	3.1	3.3	0.1	0
7	19	3.5	3.1	4.1	0	0
7	20	4.4	3.4	3.4	tr	0
Week avg		3.0	3.3	3.3	tr	0
6	30	3.2	1.8	3.9	0	0
7	1	2.6	6.7	3.0	tr	0
7	2	5.2	2.1	1.9	tr	0
7	3	8.4	8.8	8.4	0	0
Week avg		5.3	3.5	3.7	tr	0
7	7	3.9	3.3	2.5	0.1	0
7	8	10.8	7.8	8.9	0	0
7	9	5.1	1.9	10.8	0	0
7	10	2.7	3.7	7.8	0	0
7	11	8.4	8.6	2.4	0.4	0
Week avg		5.0	5.6	7.5	tr	0

Table B-33. (Concluded)

Daily samples Date 1975 Month	Day	31 Mill discharge	32 Cyclone discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	48 Ferrous metal by-products
7	15	3.2	1.2	3.3	0.1	0
7	16	11.5	6.3	1.3	0	0
7	17	7.1	5.6	5.5	0.1	0
7	18	[illegible]	[illegible]	[illegible]	[illegible]	0
Week avg		7.2	[illegible]	[illegible]	0.1	0
7	30	1.0	1.5	3.7	0.3	0
8	1	[illegible]	[illegible]	[illegible]	[illegible]	0
Week avg		[illegible]	[illegible]	7.5	0.1	0
8	5	5.6	3.5	5.2	0.2	0
8	6	7.2	1.6	3.5	0	0
8	7	7.5	3.2	4.7	tr	0
8	8	[illegible]	[illegible]	[illegible]	tr	0
Week avg		[illegible]	[illegible]	[illegible]	0.1	0
8	11	1.6	3.7	5.3	0	0
8	13	6.8	5.9	4.5	0	0
8	15	[illegible]	[illegible]	[illegible]	0.1	0
Week avg		3.7	5.0	7.6	0.03	0
8	19	1.0	10.7	5.5	tr	0
8	20	5.3	6.0	7.9	0	0
8	21	6.0	5.9	5.8	0	0
8	22	[illegible]	[illegible]	[illegible]	[illegible]	0
Week avg		[illegible]	[illegible]	[illegible]	0.1	0
8	28	11.5	4.6	4.8	0.2	0
8	29	[illegible]	[illegible]	[illegible]	tr	0
Week avg		[illegible]	[illegible]	[illegible]	0.1	0
9	2	1.8	3.7	2.3	0.1	0
9	3	1.2	3.8	3.2	0.1	0
9	4	0.6	1.7	2.5	0.1	0
9	5	[illegible]	[illegible]	[illegible]	0	0
Week avg		[illegible]	[illegible]	3.1	0.1	0
Total averagec/		[illegible]	3.7	5.6	0.11	0

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a/ Fine grind.
b/ [illegible]
c/ Average includes weekly composites November 25, 1975, through March 12, 1976.

Table 5-3g. ANALYSIS OF MILLED REFUSE STREAMS GLASS BY VISUAL ANALYSIS, wt. %
(Received moisture basis)

Daily samples Date 1976 Month	Day	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	35 Air heavies	35 Magnetic belt rejects	36 Aggregate feed	37 Magnetic drum rejects	38 Ferrous metal by-product
9	23	1.7	1.1	1.0	1.1	18.2	0	0	0
9	24	1.2	1.3	11	5.8	7.0	0	0	0
9	25	1.4	0.8	0.8	3.0	28.1	0	[illegible]	[illegible]
9	26	1.8	0.3	2.7	0.9	21.1	0	0	[illegible]
9	27	0.8	3.2	1.0	3.8	12.0	0	0	0
Week avg		1.3	1.5	0.7	5.1	17.0	0	0	0
9	30	[illegible]	0.5	0.1	10.6	5.3	0	0	0
10	1	1.2	0	0.3	5.0	16.1	0	0	0
10	2	5.2	0.6	1.8	3.6	4.1	0	0	0
10	3	1.3	2.0	1.3	17.6	29.3	0	0	0
10	4	11	0.8	1.7	3.8	11.2	0	0	0
Week avg		3.2	1.8	1.3	8.0	13.3	0	0	0
10	7	11.8	1.2			19.5			0
10	8	1.8	1.7			22.7			0
10	9	0.6	1.8			10.5			[illegible]
10	10	2.0	2.5			15.6			0
10	11	3.0	3.3			15.0			0
Week avg		3.7	1.3			16.5			[illegible]
10	15	0.5	2.3			3.0			0
10	16	1.7	0			13.1			0
10	17	1.5	1.0			11.1			0
10	18	8.0	3.2			13.8			0
Week avg		2.8	1.7			[illegible]			0
10	21	1.1	1.2			19.1			0
10	22	2.4	1.5			14.1			0
10	23	3.1	0			13.1			0
10	24	0	0			8.7			0
10	25	3.4	1.6			20.2			0
Week avg		1.7	1.1			15.3			0
11	18	1.7	[illegible]			16.3		0	0
11	19	6.3	1.1			18.1		0	0
11	20	[illegible]	1.1			21.7		0	0
11	21	1.6	3.1			11.9		0	0
11	22	[illegible]	0.5			20.2		0	0
Week avg		1.5	1.5			17.1		0	0

Table B-3a. (Continued)

Weekly composite (1974)		S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
11-25		2.7	3.2	17.8	0	0
12-2		6.0	1.3	6.6	0	0
12-9		5.9	1.3	11.5	0	0
12-30		0	0	25.8	0	0
(1975)						
1-6		13.5	0.6	13.1	tr	0
1-13		1.6	0.2	17.3	tr	tr
1-20		5.9	6.6	20.8	tr	0
1-27		8.2	3.1	5.8	tr	0
2-3		6.0	4.1	65.2	0.1	0
2-10		0.6	7.7	38.3	tr	0
2-17		7.6	7.2	56.5	0.1	0
3-3		11.7	6.9	60.5	tr	0
3-10		12.1	3.8	66.2	tr	0
3-17		1.1	tr	34.0	0.3	0
Daily samples Date 1975						
Month	Day					
3	24	0.5	1.9	22.0	tr	0
3	25	1.6	1.6	17.7	0.3	0
3	26	5.1	1.8	37.1	0.2	0
3	27	0	5.5	36.5	0.1	0
3	28	tr	7.3	30.6	0	0
3	29	3.0	3.2	33.8	tr	0
Week avg		1.8	3.5	31.0	0.1	0
3	31	6.9	2.0	21.6	0	0
4	1	2.9	5.6	25.0	tr	0
4	2	1.8	2.3	40.3	0	0
4	3	3.2	2.1	27.6	0	0
4	4	3.8	0.6	33.2	0.1	0
Week avg		3.7	2.5	29.8	tr	0
4	7	5.5	6.6	13.6	0.1	0
4	8	1.9	5.9	36.0	0.3	0
4	9	3.0	3.3	13.7	0	0
4	10	1.7	1.6	30.3	0.2	0
4	11	3.6	6.1	29.5	0.2	0
4	12	1.6	3.3	37.8	0	0
Week avg		2.9	4.5	25.1	0.1	0

Table B-1g. (Continued)

Daily samples, Date 1973 Month	Day	31 Mill discharge	32 Cyclone discharge	45 Magnetic belt rejects	47 Magnetic drum rejects	58 Ferrous metal by-products
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table B-3g. (Concluded)

Daily samples date 1975 Month	Day	31 Mill discharge	32 Cyclone discharge	35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal by-products
7	15	5.0	9.8	41.0	11	0
7	16	7.8	1.5	53.1	0.2	0
7	17	9.3	1.3	37.1	0.5	0
7	18	8.0	8.0	42.5	0.1	0
Week avg		7.5	5.6	38.5	0.2	0
7	30	7.0	5.7	41.5	0.7	0
8	1	8.8	6.0	33.0	0	0
Week avg		7.8	5.9	37.3	0.4	0
8	5	7.0	7.5	15.7	0.1	0
8	6	7.5	5.6	51.6	11	0
8	7	7.8	7.6	26.1	0	0
8	8	8.8	8.8	38.0	0	0
Week avg		7.5	7.5	29.7	0.04	0
8	11	1.2	5.9	20.7	0.6	0
8	12	1.0	3.2	35.7	0.3	0
8	13	8.8	9.2	43.2	0	0
Week avg		3.0	7.5	26.5	0.3	0
8	19	11.5	5.5	35.1	0.2	0
8	20	2.3	7.6	56.1	0.1	0
8	21	3.0	7.3	37.0	0.1	0
8	22	8.8	8.0	28.0	0.3	0
Week avg		6.3	7.7	34.5	0.2	0
8	28	1.5	5.6	22.6	0.1	0
8	31	8.8	7.3	40.6	0.2	0
Week avg		7.1	7.9	31.5	0.2	0
9	2	5.7	5.0	41.7	0.3	0
9	3	5.5	3.0	47.0	0.3	0
9	4	5.6	6.5	30.9	0.1	0
9	5	8.3	5.2	35.0	0.4	0
Week avg		6.9	7.8	38.6	0.1	0
Total average c/		6.2	3.9	27.6	0.07	0

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a/ Fine grind.
b/ Hugguttler down.
c/ Average includes weekly composites November 25, 1974, through March 17, 1975.

TABLE [illegible]. ANALYSIS OF MILLED REFUSE STREAMS MAGNETIC METAL BY VISUAL ANALYSIS, WT. %
(Received moisture basis)

Daily sample Date [illegible] Month	Day	S1 Mill discharge	S2 Cyclone discharge	S3 Storage bin discharge	S4 [illegible]	S5 Magnetic belt rejects	S6 [illegible] feed	S7 Magnetic drum rejects	S8 Ferrous metal [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			100
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	100
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	100
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	[illegible]
Week avg		[illegible]	[illegible]			[illegible]		[illegible]	[illegible]

Table 6-3h. (Continued)

Weekly composite (1974)		S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
11-25		3.2	0	19.6	91.7	99.9
12-2		7.6	0	23.1	93.8	99.6
12-9		8.3	0	7.5	96.5	99.8
12-30		6.5	0	5.1	90.1	99.3
(1975)						
1-6		9.9	0	67.1[b]	87.1	100[a]
1-13		12.9	0	56.5	71.5	99.7
1-20		7.9	0	65.8	90.1	99.8
1-27		8.0	0	69.7	91.1	99.8
2-3		9.7	0	5.6	88.0	99.7
2-10		2.1	0	22.0	91.0	100
2-17		10.0	0.5	2.5	87.7	99.7
3-3		12.1	0	28.0	95.7	99.9
3-10		11.1	0	10.0	89.0	99.9
3-17		3.9	0	16.8	79.6	99.8
Daily samples Date 1975						
Month	Day					
3	24	7.0	0	23.5	86.7	100
3	25	11.0	0	6.2	97.0	99.1
3	26	7.3	0	11.1	78.6	99.8
3	27	13.1	1	9.5	72.2	99.8
3	28	9.0	7.2	5.1	89.3	100
3	29	4.3	0	37.6	92.0	100
Week avg		7.9	1.5	15.5	86.0	99.8
3	31	5.1	0.3	20.0	96.9	99.9
4	1	7.5	5.4	5.1	81.0	99.1
4	2	6.2	0	13.5	90.1	99.9
4	3	5.7	0	11.5	89.1	100
4	4	9.6	0	8.6	95.3	99.9
Week avg		6.8	1.1	15.1	89.7	99.9
4	7	5.6	0	37.6	81.9	99.9
4	8	7.7	0	13.7	80.0	99.7
4	9	5.6	0.1	1.6	81.3	100
4	10	3.5	0	15.9	85.1	99.3
4	11	6.2	0	12.8	83.5	99.3
4	12	3.3	0.2	3.6	87.1	99.3
Week avg		5.0	0.2	15.1	83.1	99.5
4	14	4.5	0	11.8	91.7	99.9
4	15	1.6	0	1.9	97.6	99.6
4	16	3.3	0	3.2	86.8	100
Week avg		3.3	0	5.6	91.9	99.8

Table 6-[illegible]. (Continued)

Daily samples Date 1977 Month	Day	11 Mill discharge	12 Cyclone discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal by-products
5	16b/	1.6	0	68.1	c/	c/
5	19b/	1.8	0	25.7	98.1	100
5	21b/	10.9	0	13.7	97.1	100
5	22b/	10.6	0	20.1	98.7	73.8
5	23b/	3.0	0	22.6	97.0	98.1
Week avg		7.1	0	31.1	98.1	75.9
5	18	1.9	0	7.0	73.9	98.1
5	29	5.0	0	23.8	97.7	99.1
[illegible]	30	1.0	0	19.3	90.9	99.2
[illegible]	1	7.5	0	10.5	97.3	98.8
[illegible]	2	0.8	0	8.0	78.3	99.1
Week avg		5.5	0	16.6	81.9	99.6
5	9	5.5	0	11.2	98.1	98.8
Week avg		5.5	0	71.2	98.1	99.8
5	12	7.1	0	28.1	92.0	99.9
5	13	5.9	0	55.3	c/	c/
5	16	5.2	0	1.6	83.2	99.8
Week avg		5.7	0	73.1	86.8	99.9
5	19	5.8	0	9.7	96.8	99.8
5	20	5.5	1.2	13.2	93.9	99.2
Week avg		5.7	0.9	16.5	95.9	99.9
6	30	8.9	0	5.0	93.7	99.8
7	1	7.0	0	12.5	91.0	99.8
7	2	5.7	0	7.8	81.0	99.9
7	3	1.3	0	8.2	93.1	99.2
Week avg		7.2	0	11.8	91.7	99.0
7	7	5.0	0	5.7	90.7	98.7
7	8	5.0	0	7.6	87.5	99.5
7	9	6.1	0	12.3	95.9	97.7
7	10	1.6	0	5.9	93.6	99.9
7	11	8.0	0	8.2	93.1	98.8
Week avg		5.8	0	11.3	93.5	99.7
7	15	9.1	0	11.8	90.8	99.8
7	16	7.1	0	16.1	91.5	99.8
7	17	2.8	0	11.8	16.7	99.1
7	18	3.5	0	2.2	80.6	93.2
Week avg		6.7	0	12.1	87.3	99.1

Table 8-8. (Concluded)

Daily samples Date 1975 Month	Day	11 Mill discharge	12 Cyclone discharge	15 Magnetic ball rejects	17 Magnetic drum rejects	18 Ferrous metal byproduct
1	30	6.1	0	20.3	65.1	99.7
2	1	8.0	0	15.5	52.1	99.8
Week avg		7.1	0	18.4	61.1	99.8
2	5	6.1	0	14.0	88.0	99.7
2	6	6.5	0	8.6	95.0	99.6
2	7	7.1	0	11.7	96.1	99.8
2	8	8.4	0	10.1	94.1	99.7
Week avg		7.1	0	11.1	92.9	99.7
2	11	7.7	0	12.9	87.1	99.2
2	12	6.7	0	10.0	87.1	99.6
2	13	5.6	0	5.4	91.6	99.6
Week avg		6.5	0	9.3	88.7	99.4
2	19	7.1	3.5	11.0	93.7	99.7
2	20	5.7	0	9.1	91.6	99.8
2	21	6.5	0	7.0	71.9	99.8
2	22	8.0	0	11.0	[illegible]	99.8
Week avg		6.9	0.9	9.3	91.1	99.8
2	28	6.7	0	9.6	97.1	99.6
3	1	5.5	0	12.1	85.1	99.5
Week avg		6.1	0	11.1	91.6	99.6
3	[illegible]	6.6	0	7.5	77.1	98.7
3	[illegible]	8.3	0	11.2	78.2	99.0
3	[illegible]	7.6	0	17.7	88.8	99.1
3	[illegible]	8.1	0	8.1	[illegible]	99.2
Week avg		7.6	0	9.9	81.5	99.1
Total averages[d]		6.1	0.17	15.9	88.9	99.1

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[a] Changed inspection method to pick up metal in 31 average for 2 days only.
[b] Fine grind.
[c] Nuggetizer down.
[d] Average includes weekly composites November 25, 1974, through March 17, 1975.

Table B-11. [illegible]
(Received moisture basis)

Daily samples Date 1975 Month	Day	11 Mill discharge	12 Cyclone discharge	13 Storage bin discharge	14 ADS heavies	15 Magnetic belt rejects	16 [illegible] feed	17 Magnetic drum rejects	18 Ferrous metal byproducts
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]	0	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	0	0	[illegible]	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			0			0
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	0	[illegible]			[illegible]			0
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	0			0			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			0
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			0
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			0
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]
Week avg		[illegible]	[illegible]			[illegible]			[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	0
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	0
[illegible]	[illegible]	0	[illegible]			[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	0			[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]	[illegible]
Week avg		[illegible]	[illegible]			[illegible]		[illegible]	[illegible]

Table 8.31. (continued)

Weekly composite (1974)		S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic ball rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
11-15		0.9	0.1	0.3	7.8	0.1
12-2		0.2	0	0	6.1	0.3
12-9		tr	0	1.9	12.0	0
12-30		0.6	0	5.6	8.5	tr
(1975)						
1-6		1.0	0.2	3.5	11.6	0
1-13		1.1	0	0.6	23.3	0.1
1-20		0.9	0	7.7	8.1	0.2
1-27		0.5	0.3	8.3	6.5	tr
2-3		0.9	0.1	7.5	10.7	1.3
2-10		0.5	0.5	5.1	5.3	tr
2-17		0.6	0.5	9.9	11.2	0.2
3-3		1.0	0	7.3	6.6	0.1
3-10		1.1	0	1.5	13.1	0.1
3-17		0.7	0	6.5	16.1	0.2
Daily samples Date 1975						
Month	**Day**					
1	23	0.5	0	3.5	11.7	0
1	25	1.0	0	4.0	0.8	0.6
1	26	0.1	0.2	8.5	17.5	0.2
1	27	0.3	0	11.6	26.1	0.1
1	28	0.8	0	5.3	9.6	0
1	29	tr	0	3.0	tr	tr
Week avg		0.5	tr	6.0	10.8	0.1
1	31	0.6	0.3	5.1	2.8	0.1
2	3	0.2	0	4.9	12.9	0.2
2	4	0.1	0	2.2	9.0	0.4
2	5	0.1	0	9.7	8.3	0
2	6	1.0	0.0	5.4	11.2	0.4
Week avg		0.3	0.1	5.3	8.9	0.1
2	7	1.0	0.6	1.9	15.1	0.05
2	8	0.7	0	2.7	17.9	0.2
2	9	0.2	tr	1.3	15.9	0
2	10	0.5	0.9	6.0	13.2	0.1
2	11	0.3	0.6	3.3	15.0	0
2	12	0.8	0	5.4	10.1	0.1
Week avg		0.7	0.3	3.7	15.6	0.1

Table B-11. (Continued)

Daily samples — Date 1975 Month	Day	31 Mill discharge	32 Cyclone discharge	35 Magnetic belt separator	37 Magnetic drum separator	38 Ferrous metal [illegible]
1	13	0.3	0.8	1.3	[illegible]	[illegible]
1	14	0.5	0	1.6	1.1	[illegible]
1	15	0.4	0.2	11.2	10.0	11
Week avg		0.3	0.3	5.1	6.5	0.1
1	[illegible]	0.6	0	1.5	[illegible]	[illegible]
1	[illegible]	0.4	1.6	11.8	1.1	[illegible]
1	[illegible]	1.0	0	2.9	1.1	[illegible]
1	[illegible]	0.7	0.7	9.5	1.0	0
1	[illegible]	1.3	0	4.8	1.4	11
Week avg		0.6	0.1	5.7	1.3	11
1	28	0.3	0.1	5.1	12.0	0.1
1	29	0.9	0	0.7	6.7	11
1	30	0.1	0	1.6	8.0	0.1
1	1	0.6	0	5.6	13.3	0.2
1	2	0.8	0	10.8	11.8	0.1
Week avg		0.7	0.1	5.6	13.9	0.1
2	3	0.4	0	13.2	3.0	0.1
Week avg		0.5	0	13.2	3.5	0.1
2	12	0.7	1.6	5.9	7.6	11
2	13	0.5	0	3.1	6.7	[illegible]
2	14	0.2	3.6	12.7	18.2	11
Week avg		0.5	1.1	8.9	10.5	11
2	19	0.2	0.3	16.0	7.7	11
2	20	0.9	3.9	4.8	8.4	0
Week avg		0.5	1.6	10.6	7.9	11
2	26	1.8	0	5.8	3.1	11
2	27	0.7	0	5.9	3.0	0.1
2	28	0.9	0	5.6	12.2	0.01
3	1	0.8	0.6	1.8	10.4	11
Week avg		1.0	0	5.3	7.2	11
3	7	0.7	0	5.1	8.5	11
3	8	0.7	0	11.7	15.4	0.1
3	9	0.7	0	0	3.1	11
3	10	0.5	0	7.2	7.5	11
3	11	0.8	0	3.2	3.6	0
Week avg		0.7	0	5.4	7.5	11

Table B-31. (Concluded)

Daily samples, Date, 1975 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-products
1	11	0.8	0.8	1.0	7.8	[illegible]
1	16	1.0	1.0	7.8	7.1	[illegible]
1	17	[illegible]	0	[illegible]	17.1	[illegible]
1	18	1.0	0	3.1	1.2	[illegible]
Week avg		0.8	0.3	3.8	10.8	[illegible]
1	30	0.7	1.1	[illegible]	21.1	[illegible]
2	1	1.0	0	3.1	3.1	[illegible]
Week avg		0.7	0.3	[illegible]	13.1	[illegible]
2	5	1.0	1.0	5.5	8.1	0.1
2	6	0.3	0.8	7.7	5.9	0.1
2	7	0.3	0	31.5	4.1	[illegible]
2	8	1.4	0.8	3.8	8.0	[illegible]
Week avg		1.1	0.8	11.0	5.5	0.1
2	11	1.0	0.6	8.8	9.1	0.1
2	12	0.3	0	2.5	7.0	0.1
2	13	0.8	0.8	8.8	5.8	0.8
Week avg		7.8	0.6	6.3	7.3	0.1
2	18	1.1	0.1	7.6	3.9	0.1
2	20	0.9	0.5	3.5	6.0	0.1
2	21	1.1	0	6.5	7.5	0.1
2	22	0.8	0	2.0	10.0	0.1
Week avg		1.0	0.1	5.9	7.1	0.1
2	26	1.4	0.8	5.8	7.1	0.1
2	27	0.8	0	3.1	1.0	0.1
Week avg		7.0	0.3	7.5	4.0	0.1
3	3	0.8	0	1.2	23.8	0
3	4	0.8	0.5	3.1	16.5	[illegible]
3	5	0.9	0	10.1	9.2	0
3	6	0.8	0.1	2.8	8.0	0.1
Week avg		0.8	0.1	5.5	15.0	0
Total average[d]		0.61	0.39	5.7	9.6	0.11

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a/ Changed collection method to pick up metal in S8; average for 2 days only.
b/ Fine grind.
c/ Suppliers down.
d/ Average includes weekly composites November 25, 1974, through March 11, 1975.

Table B-11. ANALYSIS OF MILLED REFUSE STREAMS ORGANICS BY VISUAL ANALYSIS, Wt. %
(Received moisture basis)

Daily samples Date 1975 Month	Day	31 Mill discharge	32 Cyclone discharge	33 Storage bin discharge	34 ADS heavies	35 Magnetic belt rejects	36 Supplement feed	37 Magnetic drum rejects	38 Ferrous metal by-product
9	23	1.6	7.7	0	4.8	3.0	0	0	0
9	24	1.8	5.5	0.8	1.6	7.1	0	0	0
9	25	2.1	12.0	0.6	2.5	4.8	0	0	0
9	26	7.0	0.3	0.9	5.0	12.8	0	0	0
9	27	0	0.0	0	5.3	21.8	0	0.3	0
Week avg		2.5	3.6	0.5	3.7	11.5	0	0.1	0
9	30	0	4.0	0	18.3	26.8	0	0	0
10	1	0	1.1	0	5.1	2.1	0	0	0
10	2	3.7	2.3	0	13.1	20.1	0	1.1	0
10	3	5.4	0	2.3	10.0	16.3	0	0	0
10	6	0	1.3	0.8	7.0	14.2	0	0	0
Week avg		1.7	1.8	0.6	10.9	16.3	0	0.2	0
10	7	1.3	0			17.5			0
10	8	2.9	2.1			28.2			0
10	9	6.6	trace			16.8			0
10	10	2.1	0.7			18.5			0
10	13	0	3.0			2.3			0
Week avg		2.7	1.1			16.7			0
10	15	0.8	2.0			15.0			0
10	16	3.0	21.5			15.5			0
10	17	6.8	3.9			15.1			0
10	18	2.0	0			8.6			0
Week avg		3.1	6.8			13.5			0
10	21	1.5	2.1			28.0			0
10	22	10.5	9.3			36.5			0
10	23	3.9	0.3			19.6			0
10	24	0	1.6			60.0			0
10	25	3.1	3.6			10.6			0
Week avg		4.1	3.4			27.1			0
11	18	0	1.7			28.0		0	0
11	19	0	2.6			25.7		0	0
11	20	2.0	1.8			35.8		0	0
11	21	0.6	5.6			31.0		0	0
11	22	3.2	1.8			33.2		0	0
Week avg		1.3	2.6			31.8		0	0

Table 6-31. (Continued)

Weekly composite (1974)	14 Mill discharge	15 Cyclone discharge	16 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal by-products
11-24	0.3	0.2	17.0	0	0
12-2	tr	0	16.1	0	0
12-9	1.2	0	13.1	0	0
12-16	11.2	0	17.6	0.2	0
(1975)					
1-6	1.8	0	8.5	0	0
1-13	5.1	0.5	18.5	0	0
1-20	1.1	1.2	5.2	tr	0
1-27	0.2	3.1	9.7	0	0
2-3	0.7	1.1	10.8	0	0
2-10	5.5	t	17.3	0	0
2-17	3.1	1.8	13.0	0	0
3-3	5.9	1.5	7.7	0	0
3-10	0	0	21.5	tr	0
3-17	3.6	tr	26.5	0.1	0

Daily samples Date 1975 Month	Day	14 Mill discharge	15 Cyclone discharge	16 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal by-products
1	21	0.2	0	24.5	0	0
1	23	0	0.9	23.1	0.3	0
1	26	0	1.1	24.0	0.5	0
1	27	1.7	4.0	12.8	0.1	0
1	28	tr	tr	19.5	0	0
1	29	10.8	4.2	23.1	1.0	0
Week avg		2.1	1.8	20.2	0.1	0
1	31	3.0	1.5	19.3	0	0
2	1	3.2	2.9	16.7	tr	0
2	2	5.1	2.4	17.5	0	0
2	3	4.7	4.6	17.3	0	0
2	6	0.6	0.6	28.4	0	0
Week avg		3.7	2.5	17.6	tr	0
2	7	3.8	2.9	21.3	0	0
2	8	6.7	2.3	21.5	0	tr
2	9	3.9	1.5	30.6	0.8	0
2	10	7.9	0.5	26.6	0	0
2	11	5.0	0.3	28.9	0	0
2	12	9.2	5.2	12.8	0	0
Week avg		6.1	2.1	24.1	0.1	tr
2	14	6.7	4.3	30.7	0	0
2	15	5.6	1.2	27.2	0	0
2	16	8.3	3.2	33.7	0	0
Week avg		6.5	3.1	30.5	0	0

Table 8-11. (Continued)

Daily samples Date [illegible] Month	Day	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 Ferrous metal by-product
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table B-11. (Concluded)

Daily samples, Date 1975 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S7 Magnetic drum rejects	S8 [illegible]
7	30	12.0	10.1	5.8	0.1	[illegible]
8	1	12.2	8.1	12.2	0.1	[illegible]
Week avg		11.1	11.1	9.8	0.1	0.1
8	5	11.7	8.6	17.6	0	1
8	6	7.8	7.0	15.8	[illegible]	[illegible]
8	7	6.1	7.5	17.5	[illegible]	[illegible]
8	8	5.0	8.2	18.2	0	0
Week avg		7.5	7.9	19.3	0	[illegible]
8	11	5.2	5.7	28.9	0	0
8	13	10.5	7.6	33.3	0	0
8	15	6.8	7.8	27.4	0	0
Week avg		7.5	6.8	29.5	0	0
8	19	7.4	6.5	21.7	11	0
8	20	8.8	5.1	18.5	0	0
8	21	10.9	9.5	22.0	11	0
8	22	10.2	5.8	23.8	11	0
Week avg		9.3	7.2	21.5	11	0
8	26	5.0	5.4	13.5	0	[illegible]
8	29	5.2	11.2	30.2	0.1	[illegible]
Week avg		5.7	9.0	25.5	0.1	[illegible]
9	2	5.0	7.8	16.6	0.1	[illegible]
9	3	6.8	5.6	13.1	0	[illegible]
9	4	7.2	5.7	17.3	0	[illegible]
9	5	5.8	7.2	18.8	11	[illegible]
Week avg		6.7	7.9	16.7	0.1	[illegible]
Total average[c]		5.8	5.8	20.1	0.01	[illegible]

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[a] [illegible]

[b] [illegible]

[c] Average includes weekly composites [illegible] 1975, through [illegible]

Table B-15. ANALYSIS OF MILLED REFUSE STREAMS MISCELLANEOUS MATERIAL BY VISUAL ANALYSIS (NOT OTHERWISE CLASSIFIED AS PAPER, PLASTIC, WOOD, GLASS, METAL, OR ORGANICS), wt. %
(Received Moisture Basis)

[illegible]

Table 6-26. (Continued)

Weekly composites (1970)		31 Mill discharge	41 Cyclone discharge	45 Magnetic belt rejects	37 Magnetic drum rejects	48 Ferrous metal by-products
11-25		5.1	16.8	5.1	0	0
12-2		15.1	7.7	23.4	0	0
12-9		5.2	9.2	1.5	0.1	tr
12-30		26.1	6.8	9.6	0.1	0.1
(1971)						
1-6		20.8	19.5	1.1	0.1	tr
1-13		17.5	9.6	5.1	5.0	0.1
1-20		11.1	23.5	15.5	0.8	tr
1-27		2.6	22.8	1.7	0.8	0.2
2-3		10.7	16.9	9.8	1.0	0.2
2-10		19.3	17.3	6.7	0.1	tr
2-17		15.6	16.0	18.2	0.8	0.1
3-3		11.9	13.7	11.9	0.3	tr
3-10		5.8	16.3	16.0	0.6	tr
3-17		21.5	21.5	15.3	1.0	tr
Daily samples Date 1971						
Month	Day					
3	23	11.1	11.1	21.7	1.0	0
3	24	20.1	13.3	27.1	1.6	0.1
3	25	17.4	27.1	18.2	0.5	0
3	26	13.5	10.3	25.7	1.9	0.1
3	28	20.7	21.7	25.5	0	tr
3	29	15.6	12.0	8.1	1.2	0
Week avg		17.7	16.1	21.0	1.2	0.1
3	31	9.3	12.2	12.9	0.2	tr
4	1	13.8	21.0	24.6	0.9	tr
4	2	26.0	21.7	18.2	0.6	0
4	5	18.1	17.1	9.5	1.9	0
4	6	25.6	8.5	21.8	1.6	0
Week avg		18.6	16.1	16.8	1.0	tr
4	7	25.2	13.6	13.2	0.8	0.05
4	8	25.3	6.5	21.9	1.5	0.05
4	9	32.9	21.5	25.3	1.1	0
4	10	12.5	21.8	16.5	1.3	0
4	11	12.7	18.5	16.9	1.8	0.1
4	12	21.3	8.0	30.2	0.2	0
Week avg		21.5	17.6	22.5	1.2	tr

Table [illegible]. (Continued)

Daily samples, Date [illegible] Month	Day	11 Mill discharge	12 Cyclone discharge	15 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table B-15. (Concluded)

Daily samples, date 1975 Month	Day	11 Mill discharge	12 Cyclone discharge	13 Magnetic belt rejects	17 Magnetic drum rejects	18 Ferrous metal (pig product)
1	14	8.7	32.1	32.5	0.9	0.9
1	15	16.3	22.3	23.7	0.6	0.6
1	17	15.7	26.1	35.1	1.5	0.2
1	18	33.2	32.2	26.1	[illegible]	[illegible]
Week avg		20.9	27.3	29.5	1.1	0.1
1	30	18.1	15.2	20.5	1.1	0.1
2	3	26.3	26.2	18.0	0.2	0.—
Week avg		21.6	21.8	19.1	1.0	0.1
2	3	25.1	28.3	17.1	1.7	0.1
2	6	19.6	28.8	20.1	0.6	0.6
2	7	27.3	25.9	11.0	0.7	0.2
2	8	28.2	28.2	43.2	2.0	0.3
Week avg		25.6	25.8	30.5	1.3	0.1
2	11	12.2	22.0	23.8	0.6	0.1
2	12	13.0	18.7	18.1	5.3	0.1
2	13	30.6	38.3	15.2	1.0	0.3
Week avg		18.5	26.5	20.5	1.9	0.1
2	19	16.2	25.3	23.0	1.7	0.2
2	20	17.5	45.1	23.2	1.5	0.1
2	21	27.5	15.2	25.8	0.5	0.1
2	21	28.2	22.2	18.0	2.0	0.2
Week avg		26.1	26.3	23.1	1.5	0.1
2	26	16.1	17.1	26.6	0.2	0.2
2	28	32.8	38.2	13.9	1.5	0.2
Week avg		22.1	27.6	19.8	0.9	0.2
3	3	21.0	17.0	35.0	4.2	1.3
3	4	23.9	35.7	15.1	3.5	0.1
3	5	12.8	18.0	15.0	1.6	0.1
3	6	32.2	28.3	22.2	0.2	0.2
Week avg		22.1	22.5	22.7	1.8	0.5
Total average[c]		25.6	22.2	18.5	1.1	0.10

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[a] Fine grind.
[b] Magnetics down.
[c] Average includes weekly composites November 25, 1974, through March 11, 1975.

Table B-3f. ASH ANALYSIS OF MILLED REFUSE STREAMS, wt. %
(Received moisture basis)

Daily samples Date 1974 Month	 Day	S1 Mill discharge	S2 Cyclone discharge	S3 Storage bin discharge
9	23	33.44	21.16	18.96
9	24	26.55	20.63	17.67
9	25	21.11	15.88	18.19
9	26	27.18	17.54	20.16
9	27	21.57	19.31	20.32
Week avg		25.97	18.90	19.06
9	30	25.12	19.92	20.85
10	1	20.94	22.76	18.59
10	2	19.48	16.01	18.93
10	3	29.00	21.80	18.90
10	4	19.99	18.87	19.35
Week avg		22.91	19.87	19.32
10	7	23.75	23.41	
10	8	23.49	20.70	
10	9	16.57	18.96	
10	10	22.35	19.23	
10	11	23.53	20.90	
Week avg		21.94	20.64	
10	15	20.36	16.40	
10	16	20.08	15.96	
10	17	26.73	17.61	
10	18	21.64	15.06	
Week avg		22.19	16.25	
10	21	24.65	21.93	
10	22	26.69	17.29	
10	23	20.30	15.55	
10	24	30.03	20.23	
10	25	18.01	18.30	
Week avg		23.94	18.66	
11	18	24.56	17.05	
11	19	24.85	18.56	
11	20	18.60	15.54	
11	21	24.76	19.25	
11	22	19.21	16.89	
Week avg		22.40	17.46	

Table B-3f. (Continued)

Weekly composite (1976)	B1 Mill discharge	B2 Cyclone discharge
11-25	19.31	22.30
12-2	28.10	18.60
12-9	16.00	17.37
12-30	15.87	14.80
(1975)		
1-6	24.28	21.26
1-13	16.52	19.81
1-20	18.70	22.65
1-27	20.22	22.81
2-3	21.53	17.69
2-10	22.62	23.30
2-17	24.81	16.63
3-3	30.71	15.86
3-10	24.41	18.65
3-17	26.29	24.13

Daily samples Date 1975 Month	Day	B1 Mill discharge	B2 Cyclone discharge
3	24	27.63	28.12
3	25	36.65	28.81
3	26	30.06	28.37
3	27	18.80	14.70
3	28	26.06	24.96
3	29	19.79	15.62
Week avg		26.16	23.35
3	31	27.37	19.82
4	1	18.16	27.65
4	2	27.62	19.24
4	3	24.55	33.65
4	4	37.81	32.37
Week avg		25.10	26.55
4	7	33.99	26.42
4	8	33.90	25.00
4	9	26.62	27.55
4	10	21.73	23.95
4	11	33.89	34.51
4	12	31.78	28.80
Week avg		31.15	27.67

Table 8-37. (Continued)

Daily samples Date 1975 Month	 Day	81 Mill discharge	82 Cyclone discharge
4	14	26.76	23.67
4	15	33.53	22.38
4	16	26.97	22.93
Week avg		29.08	22.99
4	21[a]	29.44	27.75
4	22[a]	18.52	27.13
4	23[a]	19.06	22.86
4	24[a]	33.05	31.64
4	25[a]	28.55	21.60
Week avg		25.71	26.15
4	28	35.73	27.57
4	29	31.26	23.89
4	30	26.27	18.73
5	1	26.73	26.76
5	2	26.07	20.56
Week avg		29.73	23.10
5	9	19.56	19.91
Week avg		19.56	19.91
5	12	29.80	26.04
5	13	28.18	23.44
5	16	22.23	17.28
Week avg		26.74	22.25
5	19	26.78	24.17
5	20	29.88	28.94
Week avg		28.33	26.55
6	30	36.27	21.68
7	1	27.80	27.06
7	2	24.08	22.01
7	3	21.13	27.00
Week avg		27.32	24.53

Table B-3f. (Continued)

Daily samples Date 1973 Month	 Day	S1 Mill discharge	S2 Cyclone discharge
7	7	22,49	18,95
7	8	17,86	24,75
7	9	17,58	19,93
7	10	26,68	22,98
7	11	22,90	23,49
Week avg		21,50	22,02
7	14	25,88	20,91
7	16	25,31	23,44
7	17	26,76	21,54
7	18	23,96	18,28
Week avg		25,48	21,04
7	30	21,50	23,53
8	1	18,51	21,10
Week avg		20.01	22,31
8	5	18,00	17,17
8	6	23,72	20,73
8	7	21,54	23,00
8	8	28,48	23,54
Week avg		22,94	21,11
8	11	21,84	25,63
8	14	26,52	28,12
8	15	21,04	22,25
Week avg		23,13	25,33
8	19	16,03	16,09
8	20	16,89	14,86
8	21	17,36	21,78
8	22	16,48	19,97
Week avg		16,69	18,18
8	28	20,80	16,05
8	29	14,23	10,82
Week avg		17,52	13,44

Table 9-37. (Concluded)

Daily samples Date 1975 Month	 Day	81 Mill discharge	82 Cyclone discharge
3	2	13.88	17.65
3	3	21.57	16.83
3	4	17.02	17.70
3	5	16.09	20.73
Week avg		17.14	18.23
Total avg[b]		23.19	20.85

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[a] Fine grind.

[b] Average includes weekly composites November 25, 1974, through March 17, 1975.

Table 9-3m. ANALYSIS OF MILLED REFUSE STREAMS FERROUS BY CHEMICAL ANALYSIS (Fe_2O_3)
ALUMINUM BY CHEMICAL ANALYSIS (Al_2O_3), wt. %
(Received moisture basis)

Daily samples Date 1974		Ferrous (Fe_2O_3)			Aluminum (Al_2O_3)		
Month	Day	S1 Mill discharge	S2 Cyclone discharge	S3 Storage bin discharge	S1 Mill discharge	S2 Cyclone discharge	S3 Storage bin discharge
9	23	10.30	0.85	0.77	1.69	1.41	1.76
9	24	5.84	1.42	0.65	1.37	1.43	1.36
9	25	3.74	0.77	0.46	1.50	1.16	1.29
9	26	5.33	1.75	1.34	1.29	0.90	1.07
9	27	4.40	1.37	2.42	2.04	1.79	1.60
Week avg		5.92	1.23	1.13	1.58	1.34	1.42
9	30	4.82	1.00	1.11	1.72	1.55	2.32
10	1	6.62	2.75	1.45	2.66	2.71	1.63
10	2	2.50	0.67	1.36	1.42	1.17	1.37
10	3	8.17	0.91	0.92	1.71	1.61	1.37
10	4	1.08	0.78	0.90	1.63	1.47	1.57
Week avg		4.64	1.22	1.15	1.83	1.70	1.65

Table 3-3a. (Continued)

Weekly composite (1974)	Ferrous (Fe_2O_3) S1 Mill discharge	Ferrous (Fe_2O_3) S2 Cyclone discharge	Aluminum (Al_2O_3) S1 Mill discharge	Aluminum (Al_2O_3) S2 Cyclone discharge
10-7	1.60	0.88	1.41	1.78
10-15	0.73	0.59	1.57	1.21
10-21	0.18	0.52	1.36	1.42
11-18	2.03	0.53	1.05	1.46
11-25	0.91	1.12	1.30	1.40
12-2	1.25	0.52	2.03	1.34
12-9	0.45	0.45	1.33	1.44
12-30	0.43	0.45	1.02	1.25
(1975)				
1-6	1.48	1.39	1.74	1.37
1-13	0.61	0.54	1.22	1.42
1-20	0.77	0.67	1.47	1.58
1-27	0.30	0.48	1.61	1.67
2-3	1.03	0.35	1.34	1.37
2-10	1.37	1.08	1.11	1.42
2-17	0.72	1.33	1.20	2.39
3-3	1.17	0.50	2.04	1.21
3-10	9.35	2.65	1.71	1.79
3-17	1.39	0.83	1.77	1.78
3-24	3.58	0.48	1.70	1.35
3-31	1.82	1.12	2.49	1.72
4-7	1.11	0.98	1.86	1.83
4-14 to 4-16	3.36	2.98	4.46	5.76
4-18 to 4-23[a]	0.85	0.96	1.71	1.82
4-28	1.10	1.00	1.72	1.75

Table B-3a. (Concluded)

Weekly composite (1975)	Ferrous (Fe_2O_3) S1 Mill discharge	Ferrous (Fe_2O_3) S2 Cyclone discharge	Aluminum (Al_2O_3) S1 Mill discharge	Aluminum (Al_2O_3) S2 Cyclone discharge
5-5	NA[b]	NA	NA	NA
5-12	1.01	0.91	1.64	1.48
5-19	NA	NA	NA	NA
6-30	1.24	0.76	2.32	2.53
7-7	1.36	0.77	1.51	1.29
7-14	0.87	0.69	1.15	1.37
7-28	NA	NA	NA	NA
8-4	0.99	0.92	1.39	1.39
8-11	0.75	0.71	1.41	1.36
8-18	0.99	0.81	1.13	1.46
8-25	0.68	0.32	1.38	0.88
9-1	0.86	0.58	1.40	1.42
Total avg[c]	1.55	0.89	1.62	1.64

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[a] Fine grind.

[b] NA - Data not available.

[c] Average includes weekly composites October 7, 1974, through September 1, 1975, except those weeks where data was not available.

Table B-3a. ANALYSIS OF MILLED REFUSE STREAMS COPPER BY CHEMICAL ANALYSIS (CuO)
LEAD BY CHEMICAL ANALYSIS (PbO), wt. %
(Received moisture basis)

Daily samples Date 1974 Month	 Day	Copper (CuO) S1 Mill discharge	 S2 Cyclone discharge	 S3 Storage bin discharge	Lead (PbO) S1 Mill discharge	 S2 Cyclone discharge	 S3 Storage bin discharge
9	23	0.17	0.03	0.04	0.06	0.07	0.05
9	24	0.03	0.07	0.02	0.03	0.05	0.03
9	25	0.46	1.67	0.15	0.14	0.04	0.01
9	26	0.07	2.03	0.04	0.04	0.02	0.05
9	27	0.68	0.04	0.04	0.05	0.02	0.04
Week avg		0.28	0.77	0.06	0.06	0.04	0.04
9	30	0.03	0.06	0.08	0.06	0.05	0.06
10	1	0.07	0.04	0.05	0.06	0.07	0.04
10	2	0.03	0.02	0.01	0.03	0.03	0.04
10	3	0.04	0.02	<0.01	0.05	0.05	0.06
10	4	0.04	0.02	0.03	0.07	0.24	0.05
Week avg		0.04	0.03	0.04	0.05	0.09	0.05

Table 7-3a. (Continued)

Weekly composite (1974)	Copper (CuO) S1 Mill discharge	Copper (CuO) S2 Cyclone discharge	Lead (PbO) S1 Mill discharge	Lead (PbO) S2 Cyclone discharge
10-7	0.05	0.02	0.10	0.09
10-15	0.03	0.02	0.04	0.74
10-21	0.01	0.01	0.04	0.07
11-18	0.07	0.01	0.03	0.05
11-25	0.04	0.02	0.03	0.04
12-2	0.02	0.05	0.05	0.12
12-9	0.01	0.02	0.03	0.04
12-30	0.02	0.03	0.02	0.04
(1975)				
1-6	0.16	0.02	0.06	0.05
1-13	0.02	0.01	0.03	0.04
1-20	0.02	0.02	0.05	0.05
1-27	0.02	0.02	0.14	0.04
2-3	0.02	0.01	0.05	0.02
2-10	0.02	0.01	0.04	0.05
2-17	0.02	0.02	0.06	0.04
3-3	0.04	0.01	0.05	0.03
3-10	0.12	0.03	0.14	0.04
3-17	0.03	0.02	0.05	0.05
3-24	0.11	0.10	0.05	0.04
3-31	0.03	0.03	0.11	0.05
4-7	0.02	0.01	0.12	0.05
4-14 to 4-18	0.06	0.05	0.13	0.16
4-19 to 4-23[a]	0.01	0.02	0.03	0.05
4-28	0.09	0.05	0.04	0.06

Table B-36. (Concluded)

Weekly composite (1975)	Copper (Cu) S1 Mill discharge	Copper (Cu) S2 Cyclone discharge	Lead (Pb) S1 Mill discharge	Lead (Pb) S2 Cyclone discharge
5-5	NA[b]	NA	NA	NA
5-12	0.03	0.03	0.05	0.06
5-19	NA	NA	NA	NA
6-30	0.02	0.02	0.05	0.04
7-7	0.03	0.01	0.04	0.04
7-14	0.04	0.01	0.07	0.05
7-28	NA	NA	NA	NA
8-4	0.03	0.03	0.04	0.05
8-11	0.04	0.05	0.05	0.04
8-18	0.03	0.01	0.03	0.07
8-25	0.02	0.01	0.04	0.02
9-1	0.03	0.05	0.06	0.05
Total avg[c]	0.05	0.04	0.06	0.05

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a/ Flow grind.

b/ NA - data not available.

c/ Average includes weekly composites October 7, 1974, through September 1, 1975 except those weeks where data are not available.

Table B-3a. ANALYSIS OF MILLED REFUSE STREAMS NICKEL BY CHEMICAL ANALYSIS (NiO)
ZINC BY CHEMICAL ANALYSIS (ZnO), wt. %
(Received moisture basis)

Daily samples		Nickel (NiO)			Zinc (ZnO)		
Date 1974		S1	S2	S3	S1	S2	S3
		Mill	Cyclone	Storage bin	Mill	Cyclone	Storage bin
Month	Day	discharge	discharge	discharge	discharge	discharge	discharge
9	23	0.02	0.01	0.01	0.13	0.14	0.06
9	24	0.02	0.01	0.01	0.04	0.05	0.14
9	25	0.03	0.01	0.01	0.40	0.05	0.06
9	26	0.01	0.01	0.02	0.11	0.07	0.09
9	27	0.07	0.03	0.03	0.46	0.06	0.08
Week avg		0.03	0.01	0.02	0.23	0.07	0.09
9	30	0.03	0.02	0.02	0.24	0.09	0.08
10	1	0.04	0.03	0.02	0.09	0.08	0.08
10	2	0.15	0.01	0.01	0.08	0.05	0.08
10	3	0.05	0.07	0.01	0.25	0.11	0.07
10	4	0.01	0.07	0.02	0.10	0.29	0.08
Week avg		0.06	0.04	0.02	0.15	0.12	0.08

Table 9-3a. (Continued)

Weekly composite (1974)	Nickel (Ni) S1 Mill discharge	Nickel (Ni) S2 Cyclone discharge	Zinc (Zn) S1 Mill discharge	Zinc (Zn) S2 Cyclone discharge
10-7	0.02	0.02	0.04	0.09
10-15	0.02	0.02	0.05	0.05
10-21	0.01	0.02	0.05	0.06
11-18	0.01	0.02	0.04	0.07
11-25	0.02	0.02	0.06	0.16
12-2	0.02	0.05	0.07	0.11
12-9	0.02	0.01	0.03	0.04
12-30	0.01	0.01	0.03	0.04
(1975)				
1-6	0.02	0.02	0.05	0.05
1-13	0.01	0.01	0.05	0.05
1-20	0.01	0.02	0.05	0.10
1-27	0.01	0.01	0.14	0.07
2-3	0.02	0.01	0.06	0.08
2-10	0.02	0.02	0.08	0.12
2-17	0.02	0.03	0.04	0.07
3-3	0.02	0.01	0.07	0.06
3-10	0.02	0.01	0.16	0.06
3-17	0.02	0.02	0.11	0.05
3-24	0.01	0.01	0.09	0.06
3-31	0.02	0.02	0.06	0.06
4-7	0.02	0.01	0.10	0.06
4-14 to 4-16	0.05	0.05	0.16	0.19
4-18 to 4-23a/	0.01	0.01	0.07	0.07
4-28	0.01	0.02	0.13	0.08

Table B-3a. (Concluded)

Weekly composite (1975)	Nickel (Ni) S1 Mill discharge	 S2 Cyclone discharge	Zinc (Zn) S1 Mill discharge	 S2 Cyclone discharge
5-5	NA[b]	NA	NA	NA
5-12	0.04	0.01	0.07	0.45
5-19	NA	NA	NA	NA
6-30	0.03	0.02	0.12	0.08
7-7	0.03	0.02	0.11	0.05
7-14	0.02	0.03	0.10	0.06
7-28	NA	NA	NA	NA
8-4	0.04	0.03	0.05	0.05
8-11	0.22	0.11	0.03	0.05
8-18	0.03	0.03	0.06	0.07
8-25	0.01	0.01	0.04	0.04
9-1	0.01	0.02	0.10	0.06
Total avg[c]	0.07	0.02	0.08	0.07

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a/ Fine grind.

b/ NA = Data not available.

c/ Average includes weekly composites October 7, 1974, through September 1, 1975, except those weeks where data are not available.

Table B-3p. ANALYSIS OF MILLED REFUSE STREAMS FERROUS METAL BY VISUAL ANALYSIS, wt. % (Received moisture basis)

Daily samples Date 1974 Month	 Day	54 ADS heavies	55 Magnetic belt rejects	56 Nuggetizer feed	57 Magnetic drum rejects	58 Ferrous metal by-products
9	23	21.53	1.43	16.98	17.88	18.08
9	24	10.19	9.06	4.17	11.95	13.22
9	25	8.02	6.21	11.16	14.96	18.56
9	26	10.39	1.01	9.90	22.86	11.17
9	27	3.96	2.92	8.69	10.26	16.18
Week avg		10.82	4.13	10.18	15.58	15.06
9	30	5.98	3.87	11.08	13.59	15.78
10	1	8.93	5.01	20.56	17.07	13.99
10	2	9.23	2.08	8.67	14.93	12.49
10	3	7.50	2.39	17.03	9.95	13.77
10	4	7.71	1.76	12.73	12.35	16.69
Week avg		7.87	3.02	14.01	13.58	14.60
10	7		6.88			12.99
10	8		8.69			11.89
10	9		1.08			10.30
10	10		2.56			16.78
10	11		2.52			9.99
Week avg			4.35			12.39
10	15		0.02			11.98
10	16		2.85			9.98
10	17		1.61			8.99
10	18		2.15			10.99
Week avg			1.66			10.49
10	21		18.81			12.99
10	22		0.87			12.23
10	23		2.79			11.07
10	24		1.67			18.67
10	25		2.67			13.29
Week avg			5.36			13.65
11	18		2.37		8.97	10.99
11	19		1.08		15.36	11.98
11	20		0.77		11.97	7.99
11	21		2.28		14.07	15.99
11	22		3.52		14.10	13.79
Week avg			2.00		12.89	12.15

Table B-3p. (Continued)

Weekly composite (1974)		85 Magnetic belt rejects	87 Magnetic drum rejects	88 Ferrous metal by-products
11-25		0.68	8.98	9.99
12-2		5.86	6.99	7.00
12-9		1.28	10.68	8.48
12-30		0.42	15.06	11.18
(1975)				
1-6		6.89	12.09	12.69
1-13		6.62	9.98	11.79
1-20		2.68	9.90	12.20
1-27		4.00	8.65	8.39
2-3		2.16	11.18	7.19
2-10		2.49	13.58	9.00
2-17		7.13	12.09	3.30
3-3		9.77	12.60	5.69
3-10		7.32	21.19	8.[illegible]9
3-17		1.50	69.37	8.52
Daily samples				
Date 1975				
Month	**Day**			
3	24	2.83	22.59	19.69
3	25	3.69	21.68	10.20
3	26	4.03	16.58	21.66
3	27	7.16	10.21	14.29
3	28	0.98	18.35	18.19
3	29	2.37	16.06	17.00
Week avg		3.51	17.58	16.86
3	31	5.45	10.40	9.85
4	1	5.61	17.09	11.48
4	2	8.29	21.36	9.35
4	3	5.03	27.24	13.99
4	4	4.77	22.97	30.88
Week avg		5.83	19.81	15.11

Table 8-3p. (Continued)

Daily samples Date 1975 Month	 Day	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products
4	7	2.56	16.47	13.96
4	8	3.48	16.88	20.36
4	9	1.89	16.20	14.40
4	10	11.91	22.80	12.60
4	11	7.96	18.89	11.90
4	12	17.95	25.69	23.08
Week avg		7.62	19.49	16.05
4	14	4.96	15.09	10.09
4	15	7.62	12.69	11.38
4	16	1.26	15.29	10.99
Week avg		4.60	14.35	10.82
4	18a/	6.69	b/	b/
4	19a/	4.62	14.60	21.97
4	21a/	2.31	16.79	8.60
4	22a/	3.69	16.63	16.39
4	23a/	5.03	18.39	17.37
Week avg		4.47	16.60	16.08
4	28	11.70	20.47	8.41
4	29	12.82	20.68	12.39
4	30	9.57	23.39	11.98
5	1	1.17	22.07	18.57
5	2	7.72	25.17	18.60
Week avg		8.60	22.36	13.99
5	9	6.18	29.96	18.97
Week avg		6.18	29.96	18.97
5	12	1.57	18.45	13.65
5	13	6.92	b/	b/
5	16	1.18	19.23	18.69
Week avg		3.23	18.84	16.17
5	19	3.86	23.09	17.00
5	20	4.32	20.70	16.30
Week avg		4.09	21.89	16.65

Table 8-3p. (Continued)

Daily samples Date 1975 Month	 Day	85 Magnetic belt rejects	87 Magnetic drum rejects	88 Ferrous metal by-products
6	30	0,91	15,78	21,86
7	1	3,42	13,99	13,68
7	2	7,21	15,88	15,26
7	3	4,62	10,82	16,47
Week avg		4,06	14,06	16,82
7	7	2,60	19,52	21,76
7	8	1,24	11,58	12,46
7	9	2,65	14,28	11,39
7	10	2,83	18,26	15,08
7	11	3,52	24,56	16,58
Week avg		2,59	17,64	15,45
7	14	2,58	22,66	10,68
7	16	6,73	17,58	15,96
7	17	20,27	20,28	14,87
7	18	1,84	25,53	8,69
Week avg		7,86	21,52	12,55
7	30	4,44	10,65	22,08
8	1	[illegible]	[illegible]	[illegible]
Week avg		4,60	15,27	18,63
8	5	1,39	11,78	15,47
8	6	4,73	11,18	16,69
8	7	1,66	16,99	14,28
8	8	4,27	25,65	22,07
Week avg		3,01	16,40	17,13
8	11	4,66	29,85	14,46
8	14	5,71	24,73	16,68
8	15	6,73	26,13	22,35
Week avg		5,66	26,90	17,83

Table B-3p. (Concluded)

Daily samples Date 1975 Month	 Day	85 Magnetic belt rejects	87 Magnetic drum rejects	88 Ferrous metal by-products
8	19	5.49	16.58	14.46
8	20	3.61	10.60	15.50
8	21	12.88	15.15	18.06
8	22	8.70	25.78	21.08
Week avg		7.67	17.03	17.28
8	28	1.08	21.71	13.66
8	29	2.12	26.39	18.69
Week avg		1.60	24.05	16.18
9	2	6.16	16.69	17.68
9	3	0.69	18.25	12.86
9	4	3.16	13.56	13.75
9	5	2.02	23.08	20.05
Week avg		3.01	17.82	16.09
Total avg[k]		4.55	17.76	16.23

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[a] Fine grind.

[b] Nuggetizer down.

[k] Average includes weekly composites November 25, 1974, through March 17, 1975.

Table B-3q. ANALYSIS OF MILLED REFUSE STREAMS TIN CANS
BY VISUAL ANALYSIS, wt. % (Received moisture basis)

Daily samples Date 1975 Month	Day	84 ADS heavies	85 Magnetic belt rejects	86 Nuggetizer feed	87 Magnetic drum rejects	88 Ferrous metal by-products
9	23	37.90	7.39	71.73	52.75	80.07
9	24	42.60	12.73	96.33	62.75	85.38
9	25	51.06	12.93	87.25	67.80	80.54
9	26	51.86	5.99	88.47	59.01	87.45
9	27	75.16	12.80	90.56	54.06	86.70
Week avg		51.71	10.37	88.46	59.27	83.62
9	30	45.85	30.45	86.88	67.13	83.18
10	1	48.08	23.97	78.07	62.38	85.01
10	2	53.50	14.86	87.05	65.17	86.81
10	3	51.13	9.13	81.67	70.64	85.33
10	6	42.97	16.73	85.76	68.23	82.64
Week avg		48.30	19.03	83.89	66.31	84.59
10	7		10.91			96.04
10	8		7.65			85.91
10	9		7.41			87.96
10	10		11.34			82.97
10	11		16.94			86.88
Week avg			10.85			87.94
10	15		3.67			85.89
10	16		16.87			88.86
10	17		1.10			89.86
10	18		16.50			86.90
Week avg			9.54			87.88
10	21		12.08			85.91
10	22		12.48			87.13
10	23		7.69			86.97
10	24		5.95			80.77
10	25		10.67			86.51
Week avg			11.91			85.04
11	18		5.60		73.77	86.95
11	19		5.58		65.61	0.20
11	20		4.30		75.40	90.88
11	21		7.01		73.76	83.44
11	22		11.86		76.28	81.73
Week avg			6.87		72.96	68.65

Table B-3q. (Continued)

Weekly composite (1974)	65 Magnetic belt rejects	67 Magnetic drum rejects	68 Ferrous metal by-products
11-25	5.78	77.80	88.93
12-2	9.89	79.89	91.95
12-9	7.87	71.93	90.20
12-30	7.22	74.90	87.66
(1975)			
1-6	52.60	75.35	86.43
1-13	42.87	70.84	86.80
1-20	28.51	75.26	86.57
1-27	55.91	68.60	89.98
2-3	5.72	74.74	90.44
2-10	9.02	76.98	89.37
2-17	20.68	72.64	95.63
3-3	36.03	83.38	92.79
3-10	10.76	63.96	90.16
3-17	10.69	17.99	76.18

Daily samples Date 1975 Month	Day	65 Magnetic belt rejects	67 Magnetic drum rejects	68 Ferrous metal by-products
3	24	7.67	67.37	75.46
3	25	11.13	52.26	89.06
3	26	6.51	48.14	88.52
3	27	5.01	63.31	82.53
3	28	6.56	66.73	80.74
3	29	6.54	66.21	82.18
Week avg		7.23	62.33	83.22
3	31	5.37	84.69	89.50
4	1	7.06	59.78	88.04
4	2	11.40	65.89	89.76
4	3	6.72	65.46	85.77
4	4	19.42	62.43	68.93
Week avg		9.99	67.65	84.50

Table B-1q. (Continued)

Daily samples Date 1975 Month	 Day	85 Magnetic belt rejects	87 Magnetic drum rejects	88 Ferrous metal by-products
4	7	7.76	66.08	84.83
4	8	6.96	70.52	77.46
4	9	7.90	72.08	84.68
4	10	33.31	61.79	86.89
4	11	11.12	69.06	86.37
4	12	9.29	70.46	76.53
Week avg		12.72	68.33	82.79
4	14	8.65	76.13	88.13
4	15	4.55	77.95	88.07
4	16	23.40	65.73	88.61
Week avg		12.20	73.27	88.27
4	18a/	36.45	b/	b/
4	19a/	21.62	79.60	76.70
4	21a/	15.81	81.57	91.28
4	22a/	22.41	81.65	83.32
4	23a/	21.39	76.20	82.28
Week avg		23.57	79.52	83.39
4	28	12.57	60.22	91.55
4	29	10.83	72.12	87.65
4	30	3.30	68.78	87.29
5	1	5.86	65.42	81.05
5	2	3.08	55.60	79.28
Week avg		7.13	64.43	85.33
5	3	10.51	64.82	78.83
Week avg		10.51	64.82	78.76
5	12	13.08	75.81	85.57
5	13	30.19	b/	b/
5	16	4.02	58.38	80.26
Week avg		15.76	67.09	82.91
5	19	20.03	72.86	82.48
5	20	6.11	73.39	82.99
Week avg		13.07	73.13	82.73

Table B-3q. (Continued)

Daily samples Date 1975 Month	 Day	85 Magnetic belt rejects	87 Magnetic drum rejects	88 Ferrous metal by-products
6	30	10.94	80.27	77.56
7	1	20.06	80.23	85.80
7	2	13.88	71.59	83.79
7	3	15.07	79.97	82.56
Week avg		14.99	78.01	82.43
7	7	19.30	79.99	77.60
7	8	15.59	78.57	86.74
7	9	18.58	79.80	88.13
7	10	13.63	75.35	85.70
7	11	13.27	66.98	82.78
Week avg		16.05	76.12	84.19
7	15	5.07	67.29	88.56
7	16	16.63	69.16	83.29
7	17	18.18	72.14	78.73
7	18	19.38	63.53	90.76
Week avg		14.82	68.03	85.34
7	30	23.66	65.13	77.54
8	1	12.80	71.21	84.61
Week avg		18.23	68.17	81.07
8	5	9.87	77.85	84.05
8	6	6.99	84.56	82.73
8	7	12.30	77.13	84.79
8	8	15.88	70.26	77.38
Week avg		11.16	77.45	82.24
8	11	6.08	57.80	85.18
8	14	11.10	70.69	82.80
8	15	13.16	67.73	76.92
Week avg		10.11	65.41	81.64

Table B-3q. (Concluded)

Daily samples Date 1974 Month	 Day	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products
8	19	9.31	77.01	84.69
8	20	5.27	63.59	83.27
8	21	12.13	70.05	81.36
8	22	12.66	65.25	78.22
Week avg		9.85	68.98	81.88
8	28	12.26	57.86	85.37
8	29	16.06	67.67	80.67
Week avg		14.16	62.76	83.02
9	2	16.73	77.26	82.00
9	3	23.19	71.22	86.63
9	4	25.93	69.59	85.60
9	5	20.62	67.36	79.62
Week avg		21.95	71.35	83.41
Total avg[c]		16.08	69.71	85.20

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[a] Fine grind.
[b] Nuggetizer down.
[c] Average includes weekly composite November 21, 1974, through March 17, 1975.

Table B-3r. ANALYSIS OF MILLED REFUSE STREAMS ALUMINUM BY VISUAL ANALYSIS, wt. % (Received moisture basis)

Daily samples Date 1976 Month	Day	54 ADS heavies	55 Magnetic belt rejects	56 Nuggetizer feed	57 Magnetic drum rejects	58 Ferrous metal by-products
9	23	1.84	2.59	0	13.41	0.10
9	24	2.78	2.51	0	20.93	0.05
9	25	1.36	2.36	0	15.95	0.10
9	26	2.57	4.63	0	17.27	0.10
9	27	0.99	3.75	0	15.58	0.06
Week avg		2.31	3.01	0	16.60	0.08
9	30	1.99	6.86	0	13.90	0.10
10	1	2.51	3.56	0	14.97	0.05
10	2	1.71	3.57	0	17.31	0.08
10	3	1.78	3.50	0	15.92	0.004
10	4	3.55	4.53	0.02	17.33	0.10
Week avg		2.29	4.18	0.004	15.90	0.07
10	7		1.47			0.06
10	8		2.59			0.06
10	9		1.50			0.10
10	10		1.30			0.09
10	11		1.51			0.10
Week avg			1.67			0.08
10	15		1.69			0.13
10	16		1.77			0.10
10	17		2.79			0.10
10	18		2.87			0
Week avg			2.32			0.08
10	21		2.67			0.10
10	22		3.38			0.10
10	23		2.28			0.10
10	24		3.96			0.001
10	25		5.78			0.10
Week avg			3.61			0.08
11	18		5.59		13.96	0.20
11	19		6.16		15.97	0
11	20		3.66		9.67	0.08
11	21		1.69		9.58	0.10
11	22		8.53		7.90	2.60
Week avg			5.06		11.59	0.60

Table 8-3r. (Continued)

Weekly composite (1974)		35 Magnetic belt rejects	37 Magnetic drum rejects	38 Ferrous metal by-products
11-25		2,89	10,97	0,20
12-2		2,71	9,99	0,10
12-9		2,99	13,67	0,20
12-30		2,32	7,68	0,06
(1975)				
1-6		1,21	9,69	0,05
1-13		2,33	17,57	0,07
1-20		2,58	13,60	0,10
1-27		1,77	18,39	0,06
2-3		1,66	17,68	0,60
2-10		3,25	5,89	0,07
2-17		1,15	12,99	0,20
3-3		1,81	3,60	0
3-10		3,83	12,59	0,10
3-17		10,53	9,13	0,15
Daily samples				
Date 1975				
Month	**Day**			
3	24	3,90	8,90	0,17
3	25	4,25	12,59	0,30
3	26	4,05	21,07	0,29
3	27	2,19	19,06	0,19
3	28	4,54	12,37	0,35
3	29	2,22	16,96	0,07
Week avg		3,53	15,79	0,23
3	31	4,36	4,30	0,16
4	1	0,81	15,19	0,06
4	2	3,55	12,68	0,11
4	3	6,77	5,68	0,09
4	4	3,87	12,39	0,16
Week avg		3,87	10,05	0,11

Table B-3r. (Continued)

Daily samples Date 1975 Month	Day	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products
4	7	3.80	15.87	0
4	8	3.66	10.89	0.15
4	9	4.69	10.30	0.68
4	10	3.57	13.20	0.42
4	11	3.35	13.39	0.07
4	12	0.69	3.30	0.36
Week avg		3.28	11.16	0.28
4	14	1.51	7.59	0.08
4	15	3.73	7.60	0.20
4	16	2.47	15.98	0.10
Week avg		2.57	10.39	0.13
4	18a/	3.16	b/	b/
4	19a/	3.60	0.80	0.39
4	21a/	3.73	1.00	0
4	22a/	1.97	0.59	0.02
4	23a/	3.02	1.65	0.03
Week avg		3.10	1.01	0.11
4	28	2.62	17.26	0.20
4	29	2.86	6.49	0.09
4	30	2.81	0.27	0.40
5	1	1.93	10.29	0.13
5	2	5.77	16.85	0.12
Week avg		3.19	10.23	0.19
5	9	4.77	1.30	0.09
Week avg		4.77	1.30	0.09
5	12	4.72	4.59	0.17
5	13	1.67	b/	b/
5	16	2.99	19.33	0.15
Week avg		3.06	11.96	0.16
5	19	3.95	3.60	0.20
5	20	2.61	5.00	0.10
Week avg		3.28	4.30	0.15

Table B-3c. (Continued)

Daily samples Date 1975 Month	 Day	85 Magnetic belt rejects	87 Magnetic drum rejects	88 Ferrous metal by-products
6	30	2,87	2,80	0,04
7	1	9,15	4,80	0,10
7	2	8,46	10,88	0,30
7	3	3,05	7,15	0,20
Week avg		5,87	6,41	0,16
7	7	10,66	6,18	0,10
7	8	4,71	7,59	0,10
7	9	5,83	3,19	0,10
7	10	3,66	5,39	0,09
7	11	4,85	7,19	0,20
Week avg		5,94	6,29	0,12
7	15	6,05	8,39	0,08
7	16	6,65	15,60	0,01
7	17	[illegible]	6,10	0,07
7	18	2,89	5,58	0,08
Week avg		4,51	9,64	0,06
7	30	11,45	20,81	0,50
8	1	3,57	7,79	0
Week avg		7,51	14,30	0,25
8	5	6,01	8,78	0,07
8		1,06	3,69	0,07
8	7	7,30	4,90	0,10
8	8	3,76	3,19	0,07
Week avg		4,53	5,14	0,08
8	11	4,06	11,08	0,07
8	14	6,74	4,19	0
8	15	2,73	5,49	0,07
Week avg		4,51	6,92	0,07

Table B-3c. (Concluded)

Daily samples Date 1975 Month	 Day	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products
8	19	2.07	5.49	0.03
8	20	1.93	5.18	0.06
8	21	1.03	12.46	0.11
8	22	6.56	7.09	0.10
Week avg		2.90	7.56	0.08
8	28	6.31	16.81	0.07
8	29	6.31	5.30	0.08
Week avg		6.31	11.06	0.08
9	2	6.99	5.10	0.08
9	3	5.07	8.68	0.09
9	4	6.69	14.93	0.08
9	5	7.06	8.29	0.05
Week avg		6.45	9.25	0.08
Total avg[c]		6.17	9.81	0.14

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a/ Fine grind.
b/ Nuggetizer down.
c/ Average includes weekly composites November 25, 1974, through March 17, 1975.

Table B-3e. ANALYSIS OF MILLED REFUSE STREAMS COPPER BY VISUAL ANALYSIS, wt. % (Received moisture basis)

Daily samples Date 1975 Month	Day	84 ADS heavies	85 Magnetic belt rejects	86 Nuggetizer feed	87 Magnetic drum rejects	88 Ferrous metal by-products
9	23	0.46	0.20	0	2.68	0
9	24	0.19	1.23	0	0.20	0
9	25	0	0.30	0	0.50	0
9	26	0.10	0.29	0.01	0.20	0
9	27	0.06	0.09	0	0.58	0.01
Week avg		0.16	0.42	0.002	0.83	0.002
9	30	0.40	0.79	0	1.00	0.30
10	1	1.49	0.08	0	0.70	0
10	2	0.10	1.08	0	0.40	0.005
10	3	0.05	0.60	0	0.30	0
10	4	0.09	0.46	0	0.90	0
Week avg		0.43	0.60	0	0.66	0.06
10	7		0.92			0
10	8		0.09			0
10	9		8.41			0
10	10		1.08			0.15
10	11		1.08			0
Week avg			2.32			0.03
10	15		0.69			0
10	16		0.57			0
10	17		0.17			0
10	18		1.98			0
Week avg			0.85			0
10	21		0.18			0
10	22		1.13			0
10	23		0.51			0
10	24		0.08			0
10	25		1.33			0.03
Week avg			1.23			0.006
11	18		0.25		0.40	0
11	19		0.25		0.30	0
11	20		0.17		0.30	0
11	21		0.08		0.40	0
11	22		0.17		0.40	0.20
Week avg			0.18		0.36	0.04

Table 8-3a. (Continued)

Weekly composite (1974)		85 Magnetic belt rejects	87 Magnetic drum rejects	88 Ferrous metal by-products
11-25		0,17	0,50	0
12-2		0,06	0,30	0
12-9		1,11	0,30	0,01
12-30		0,42	0,39	0
(1975)				
1-6		0,47	0,80	0,002
1-13		0,05	1,50	0
1-20		0,19	0,90	0,001
1-27		0,65	0,60	0,002
2-3		0,17	0,50	0,10
2-10		0,04	0,30	0
2-17		1,06	0,30	0
3-3		0,09	0,06	0
3-10		1,29	0,10	0
3-17		1,10	0,41	0
Daily samples Date 1975				
Month	Day			
3	24	0,75	0,37	0
3	25	0,35	0,89	0
3	26	0,40	0,22	0
3	27	1,08	0,54	0
3	28	0,85	0,21	0
3	29	0,97	0,59	0
Week avg		0,73	0,47	0
3	31	0,59	0,04	0,16
4	1	0,58	2,17	0
4	2	1,48	0,63	0
4	3	0,82	0,78	0
4	4	0,68	0,88	0
4	5	a	a	a
Week avg		0,83	0,88	0,03

Table B-3a. (Continued)

Daily samples Date 1975 Month	Day	65 Magnetic belt rejects	67 Magnetic drum rejects	68 Ferrous metal by-products
4	7	0.99	0.58	0
4	8	1.43	0.77	0
4	9	0.72	0.60	0
4	10	0.86	0.43	0
4	11	0	0.26	0
4	12	0.28	0.13	0
Week avg		0.71	0.46	0
4	14	0.92	0.32	0
4	15	0.25	1.00	0
4	16	0.75	0.56	0
Week avg		0.64	0.63	0
4	18a/	0.27	b/	b/
4	19a/	0.17	0	0
4	21a/	0.12	0	0
4	22a/	0.95	0	0
4	23a/	1.19	0.02	0.03
Week avg		0.54	0.01	0.01
4	28	0.46	0.43	0
4	29	0.69	0.09	0
4	30	0	0.27	0
5	1	0.44	0.60	0
5	2	0.98	0.69	0
Week avg		0.51	0.42	0
5	9	0.88	0.08	0
Week avg		0.88	0.08	0
5	12	1.41	0	0
5	13	0	b/	b/
5	16	0	0.63	0
Week avg		0.47	0.31	0

Table 6-3e. (Continued)

Daily samples Date 1975 Month	 Day	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products
6	19	0	0,09	0
6	20	0,59	0,33	0
Week avg		0,29	0,21	0
6	30	0,31	0,10	0
7	1	0,46	0,30	0
7	2	2,58	0,30	0
7	3	0	0,20	0
Week avg		0,84	0,23	0
7	7	0	0,08	0
7	8	0,62	0,30	0
7	9	0,04	0,07	0
7	10	0,58	0,04	0
7	11	0,53	0,50	0
Week avg		0,35	0,20	0
7	14	0,81	0,50	0,08
7	16	0,73	0,50	0
7	17	0,19	0,30	0
7	18	0,61	0,20	0
Week avg		0,58	0,37	0,02
7	30	0,09	0,78	0
8	1	0,10	0,02	0
Week avg		0,10	0,40	0
8	5	0,15	0,03	0
8	6	0	0,07	0
8	7	0,07	0,14	0
8	8	0,73	0,05	0
Week avg		0,26	0,07	0
8	11	2,23	0,25	0
8	14	0,13	0,12	0
8	15	0,92	0,09	0
Week avg		1,09	0,15	0

Table B-3a. (Concluded)

Daily samples Date 1975 Month	 Day	85 Magnetic belt rejects	87 Magnetic drum rejects	88 Ferrous metal byproducts
8	19	1.06	0.42	0
8	20	0.50	0.07	0
8	21	0.32	0.27	0
8	22	0.23	1.10	0
Week avg		0.53	0.46	0
8	28	0.12	0.85	0
8	29	0.46	0.18	0
Week avg		0.29	0.51	0
9	2	0.13	0.21	0
9	3	1.84	0.79	0
9	4	0.25	0.26	0
9	5	0.12	0.13	0
Week avg		0.58	0.35	0
Total avg[c]		0.66	0.43	0.01

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a/ Fine grind.

b/ Nuggetizer down.

c/ Average includes weekly composites November 25, 1974, through March 17, 1975.

Table B-31. ANALYSIS OF MILLED REFUSE STREAMS: SQUARE SCREEN SIZE, wt %
(Received moisture basis)

Daily samples Date 1975		Larger than 63.5 mm					
Month	Day	41 Mill discharge	52 Cyclone discharge	55 ADS heavies	75 Magnetic belt rejects	56 Nuggetizer feed	58 Ferrous metal by-products
9	23	0	0	0	0	7.5	0
9	24	0	0	0	0	0	0
9	25	10.9	8.7	13.9	0	0	0
9	26	0	6.3	0	0	0	0
9	27	26.0	0	0	8.1	0	0
Week avg		7.4	3.0	3.7	1.6	1.5	0
9	30	0	0	0	0	2.3	0.7
10	1	0	0	0	0	0	0
10	2	0	0	0	3.1	0	0
10	3	0	0	0	0	0	0
10	4	0	0	0	0	0	0
Week avg		0	0	0	0.6	0.5	0.1
10	7	0	0		11.0		0
10	8	0	1.0		0		0
10	9	0	0		0		0
10	10	2.9	0		0		0
10	11	0	0		0		0
Week avg		0.6	0.2		2.2		0
10	15	0	0		0		0
10	16	0	0		0		0
10	17	0	0		0		0
10	18	0	0		0		0
Week avg		0	0		0		0
10	21	0	0		5.5		0
10	22	0	0		0		0
10	23	0	0		24.2		0
10	24	0	0		0		0
10	25	0	0		0		0
Week avg		0	0		5.9		0
11	18	0	0		4.7		0
11	19	0	2.6		0		0
11	20	0	1.1		0		0
11	21	0	0		0		0
11	22	0	3.8		0		0
Week avg		0	1.5		0.9		0

Table B-31. (Continued)

Weekly composite (1974)		Larger than 13.3 mm 11 Mill discharge	87 Cyclone discharge	15 Magnetic belt rejects	18 Ferrous metal by-products
11-25		8.2	12.5	4.8	0
12-2		0	5.2	0	0
12-9		1.9	0	0	0
12-30		0	0.5	0	0
(1975)					
1-6		0	0	11.8	0
1-13		2.5	0	0	0
1-20		2.5	0	0	0
1-27		2.9	0	6.9	0
2-3		0.7	3.3	0	0
2-10		1.0	0	0	0
2-17		0	0	6.0	0
3-3		0	7.0	0	0
3-10		0	11.3	0	0
3-17		0	1.7	0	0
Daily samples Date 1975					
Month	Day				
3	24	0	0	2.1	0
3	25	0	1.5	1.5	0
3	26	0	0	0	0
3	27	0	0	1.0	0
3	28	0	1.1	0	0
3	29	0	0	1.8	0
Week avg		0	0.5	1.1	0
3	31	0	0	0	0
4	1	2.2	0.6	0	0
4	2	0	0.9	0	0
4	3	2.2	0	2.1	0
4	4	0	0	0	0
Week avg		0.9	0.3	0.5	0
4	7	0	0	0	0
4	8	0	0	1.2	0
4	9	0	0	1.0	0
4	10	2.6	1.3	0	0
4	11	0	0	1.6	0
4	12	1.5	0	2.0	0
Week avg		0.7	0.2	1.0	0

Table [illegible]. (Continued)

Daily samples Date 197[illegible] Month	Day	Larger than [illegible] mm 11 Mill discharge	12 cyclone discharge	17 Magnetic belt rejects	18 Ferrous metal by-products
[illegible]	14	0	0	0	0
[illegible]	15	0	0	0	0
[illegible]	16	0	0	0	0
Week avg		0	0	0	0
[illegible]	18a/	0	0	0	b/
[illegible]	19a/	0	0	0	0
[illegible]	21a/	0	0	0	0
[illegible]	22a/	0	0	0	0
[illegible]	23a/	0	0	0	0
Week avg		0	0	0	0
[illegible]	28	0	0	0	0
[illegible]	29	0	0	0	0
[illegible]	30	[illegible]	0	0	0
[illegible]	1	0	[illegible]	0	0
[illegible]	2	0	0	0	0
Week avg		[illegible]	0	0	0
[illegible]	[illegible]	0	0	[illegible]	0
Week avg		[illegible]	0	[illegible]	0
[illegible]	12	0	0	[illegible]	0
[illegible]	13	[illegible]	0	0	b/
[illegible]	14	0	0	0	0
Week avg		[illegible]	0	[illegible]	0
[illegible]	19	0	0	[illegible]	0
[illegible]	20	0	0	0	[illegible]
Week avg		0	0	[illegible]	0
6	30	0	0	0	0
7	1	0	0	0	0
7	2	0	0	11.0	0
7	3	0	0	0	0
Week avg		0	0	[illegible]	0
7	7	0	0	[illegible]	0
7	8	0	0	0	0
7	9	0	0	0	0
7	10	0	0	0	0
7	11	[illegible]	0	[illegible]	0
Week avg		[illegible]	0	[illegible]	0

Table 8-31. (Continued)

Daily samples Date 1975 Month	Day	Larger than 63.5 mm S1 Mill discharge	 S2 Cyclone discharge	 S5 Magnetic belt rejects	 S8 Ferrous metal by-products
7	15	0	0	0	0
7	16	0	0	0	0
7	17	0	3.1	0	0
7	18	0	0.9	0	0
Week avg		0	1.0	0	0
7	30	0	0	0	0
8	1	0	0.8	0	0
Week avg		0	0.4	0	0
8	5	23.0	0	0	0
8	6	0	0	0	0
8	7	0	0	0	0
8	8	0	0	0	0
Week avg		5.8	0	0	0
8	11	0	0	12.5	0
8	14	0	0	0	0
8	15	0	0	0	0
Week avg		0	0	4.2	0
8	19	0	0	0	0
8	20	0	0	0	0
8	21	0	0	0	0
8	22	0	0	0	0
Week avg		0	0	0	0
8	28	0	0	0	0
8	29	0	0	0	0
Week avg		0	0	0	0
9	2	0	0	0	0
9	3	0	0	0	0
9	4	0	0	0	0
9	5	0	2.0	0	0
Week avg		0	0.5	0	0
Total average[b]		1.1	1.1	1.7	0

Table B-34: (Continued)

Daily samples Date 1976 Month	 Day	Smaller than 51.5 mm S1 Mill discharge	 S2 Cyclone discharge	 S4 ADS heavies	 S5 Magnetic belt rejects	 S6 Nuggetizer feed	 S8 Ferrous metal by-products
9	23	100	100	100	100	92.6	100
9	24	100	100	100	100	100	100
9	25	89.1	91.1	84.1	100	100	100
9	26	100	93.7	100	100	100	100
9	27	74.0	100	100	93.0	100	100
Week avg		92.6	97.0	96.8	98.6	98.5	100
9	30	100	100	100	100	97.7	99.3
10	1	100	100	100	100	100	100
10	2	100	100	100	96.9	100	100
10	3	100	100	100	100	100	100
10	4	100	100	100	100	100	100
Week avg		100	100	100	99.4	99.5	99.9
10	7	100	100		89.0		100
10	8	100	99.0		100		100
10	9	100	100		100		100
10	10	97.1	100		100		100
10	11	100	100		100		100
Week avg		99.4	99.8		97.8		100
10	15	100	100		100		100
10	16	100	100		100		100
10	17	100	100		100		100
10	18	100	100		100		100
Week avg		100	100		100		100
10	21	100	100		94.6		100
10	22	100	100		100		100
10	23	100	100		75.8		100
10	24	100	100		100		100
10	25	100	100		100		100
Week avg		100	100		94.1		100
11	18	100	100		95.3		100
11	19	100	97.6		100		100
11	20	100	98.7		100		100
11	21	100	100		100		100
11	22	100	94.2		100		100
Week avg		100	98.1		99.1		100

Table D-31. (Continued)

Weekly composite (1974)		Smaller than 63.5 mm S1 Mill discharge	S2 Cyclone discharge	S3 Magnetic belt rejects	S8 Ferrous metal by-products
11-25		91.8	87.5	93.2	100.0
12-2		100.0	95.8	100.0	100.0
12-9		96.1	100.0	100.0	
12-30		100.0	95.5	100.0	100.0
(1975)					
1-6		100.0	100.0	87.2	100.0
1-13		97.5	100.0	100.0	100.0
1-20		97.5	100.0	100.0	100.0
1-27		97.1	100.0	93.1	100.0
2-3		99.3	96.8	100.0	100.0
2-10		97.0	100.0	100.0	100.0
2-17		100.0	100.0	94.0	100.0
3-3		100.0	98.0	100.0	100.0
3-10		100.0	88.7	100.0	100.0
3-17		100.0	93.3	100.0	100.0
Daily samples Date 1975 Month	Day				
3	24	100	100	97.7	100
3	25	100	98.5	94.5	100
3	26	100	100	100	100
3	27	100	100	97.0	100
3	28	100	98.9	100	100
3	29	100	100	98.1	100
Week avg		100	99.6	97.9	100
3	31	100	100	100	100
4	1	97.8	99.4	100	100
4	2	100	99.1	100	100
4	3	97.8	100	97.7	100
4	4	100	100	100	100
Week avg		99.1	99.7	99.5	100
4	7	100	100	100	100
4	8	100	100	98.8	100
4	9	100	100	97.0	100
4	10	97.6	98.7	100	100
4	11	100	100	96.6	100
4	12	98.6	100	97.0	100
Week avg		99.3	99.8	98.2	100

Table B-31. (Continued)

Daily samples Date 1975 Month	 Day	Smaller than 63.5 mm 51 Mill discharge	 52 Cyclone discharge	 55 Magnetic belt rejects	 58 Ferrous metal by-products
5	14	100	100	100	100
5	15	100	100	100	100
5	16	100	100	100	100
Week avg		100	100	100	100
5	18a/	100	100	100	b/
5	19a/	100	100	100	100
5	21a/	100	100	100	100
5	22a/	100	100	100	100
5	23a/	100	100	100	100
Week avg		100	100	100	100
5	28	100	100	100	100
5	29	100	100	100	100
5	31	97.9	100	100	100
6	1	100	100	100	100
6	2	100	100	100	100
Week avg		99.6	100	100	100
6	9	100	100	95.0	100
Week avg		100	100	95.0	100
6	12	100	100	95.7	100
6	13	97.8	100	100	b/
6	16	100	100	100	100
Week avg		99.3	100	98.6	100
6	19	100	100	95.0	100
6	20	100	100	100	100
Week avg		100	100	97.5	100
6	30	100	100	100	100
7	1	100	100	100	100
7	2	100	100	87.0	100
7	3	100	100	100	100
Week avg		100	100	96.8	100
7	7	100	100	98.9	100
7	8	100	100	100	100
7	9	100	100	100	100
7	10	100	100	100	100
7	11	89.9	100	97.2	100
Week avg		98.0	100	99.2	100

Table B-31. (Continued)

Daily samples Date 1975 Month	Day	Smaller than 63.5 mm S1 Mill discharge	S2 Cyclone discharge	S3 Magnetic belt rejects	S8 Ferrous metal by-products
7	15	100	100	100	100
7	16	100	100	100	100
7	17	100	96.9	100	100
7	18	100	99.1	100	100
Week avg		100	99.0	100	100
7	30	100	100	100	100
8	1	100	99.2	100	100
Week avg		100	99.6	100	100
8	5	77.0	100	100	100
8	6	100	100	100	100
8	7	100	100	100	100
8	8	100	100	100	100
Week avg		94.3	100	100	100
8	11	100	100	87.5	100
8	13	100	100	100	100
8	15	100	100	100	100
Week avg		100	100	95.8	100
8	19	100	100	100	100
8	20	100	100	100	100
8	21	100	100	100	100
8	22	100	100	100	100
Week avg		100	100	100	100
8	28	100	100	100	100
8	29	100	100	100	100
Week avg		100	100	100	100
9	2	100	100	100	100
9	3	100	100	100	100
9	4	100	100	100	100
9	5	100	98.0	100	100
Week avg		100	99.5	100	100
Total average[a]		98.9	98.9	99.1	100

Table B-36. (Continued)

Daily samples Date 1975 Month	Day	51 Mill discharge	52 Cyclone discharge	54 ADS heavies	55 Magnetic belt rejects	56 Nuggetizer feed	58 Ferrous metal byproducts
		Smaller than 19.1 mm					
9	23	100	97.1	100	88.9	76.5	100
9	24	89.2	100	87.7	100	100	97.7
9	25	61.0	83.5	72.7	100	91.8	100
9	26	89.9	86.1	82.2	89.9	71.2	100
9	27	71.9	93.2	87.2	91.9	56.7	100
Week avg		82.5	92.0	86.0	95.1	78.8	99.5
9	30	100	100	92.7	100	95.3	99.3
10	1	95.4	99.2	98.0	86.5	69.9	100.0
10	2	100	100	94.7	80.8	67.6	100.0
10	3	97.3	99.1	100	84.8	85.1	99.2
10	6	92.5	95.3	96.6	93.2	94.6	100.0
Week avg		97.0	98.7	96.0	90.6	82.3	99.7
10	7	100	99.0		89.0		98.4
10	8	96.7	99.0		100		100
10	9	96.4	95.7		100		96.2
10	10	97.1	100		100		100
10	11	96.9	89.2		100		100
Week avg		96.5	96.7		97.8		98.9
10	15	96.1	100		99.0		100
10	16	98.9	100		98.8		100
10	17	97.2	97.2		99.6		100
10	18	100	96.2		94.8		100
Week avg		98.1	98.5		98.0		100
10	21	99.1	93.5		94.5		100
10	22	100	96.6		100		97.8
10	23	93.2	98.7		75.8		100
10	24	96.0	97.5		99.1		100.0
10	25	98.8	96.3		97.5		100.0
Week avg		97.4	96.8		93.4		99.5
11	18	98.0	93.7		93.8		100.0
11	19	97.6	93.6		97.5		98.0
11	20	95.5	92.6		97.8		95.5
11	21	98.8	93.5		93.1		97.5
11	22	96.1	93.2		92.2		95.6
Week avg		97.2	93.3		94.9		97.3

Table 8-11. (Continued)

	Smaller than 31.1 mm			
Weekly composite (date)	S1 Mill discharge	S2 Cyclone discharge	S7 Magnetic belt rejects	S8 Ferrous metal by-products
11-25	90.7	81.7	87.3	91.5
12-2	91.6	91.8	100.0	100.0
12-9	92.3	85.2	90.3	100.0
12-30	91.7	77.2	93.5	100.0
(1975)				
1-6	100.0	98.9	30.7	95.1
1-13	88.8	98.6	95.2	100.0
1-20	95.7	90.2	100.0	95.7
1-27	97.1	92.0	17.5	100.0
2-3	97.9	88.9	100.0	100.0
2-10	91.0	91.9	95.6	97.8
2-17	95.0	78.3	81.2	95.5
3-3	95.7	70.0	90.3	95.0
3-10	57.3	78.7	93.1	95.0
3-17	98.3	95.8	97.8	100.0

Daily samples Date 1975 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S7 Magnetic belt rejects	S8 Ferrous metal by-products
1	22	55.1	91.8	91.5	100
1	23	100	89.1	77.5	97.6
1	24	97.6	91.8	86.8	100
1	27	95.0	95.2	93.1	98.2
1	28	78.7	86.1	95.7	95.7
1	29	100	98.8	98.0	100
Week avg		93.0	97.1	93.3	99.5
1	31	81.7	91.9	87.1	100
2	3	95.0	91.0	96.6	96.1
2	4	100	96.1	93.7	96.3
2	5	95.4	87.5	95.8	95.1
2	6	73.2	98.2	83.4	100.0
Week avg		95.1	98.7	90.6	99.1
2	7	71.6	98.5	100	93.0
2	8	100	95.0	97.1	100
2	9	92.0	87.7	77.0	100
2	10	96.7	97.2	96.7	100
2	11	93.1	98.7	96.2	96.1
2	12	98.6	93.3	93.5	98.8
Week avg		96.1	95.9	97.0	98.9

Table 8-31. (Continued)

Daily samples Date 1975 Month	Day	Smaller than 38.1 μm S1 Mill discharge	 S2 Cyclone discharge	 S5 Magnetic belt rejects	 S8 Ferrous metal by-products
4	14	98.5	97.1	100	100
4	15	91.9	93.0	89.6	100
4	16	96.8	96.5	89.1	95.9
Week avg		95.7	95.5	92.9	98.6
4	18a/	100	100	100	b/
4	19a/	100	100	100	100
4	21a/	100	100	100	100
4	22a/	100	100	100	100
4	23a/	99.1	100	100	100
Week avg		99.8	100	100	100
4	28	100	100	99.3	100
4	29	100	100	95.6	100
4	30	97.9	92.3	99.2	98.9
5	1	99.1	87.9	77.7	100
5	2	100	100	100	98.1
Week avg		99.5	96.0	94.1	99.4
5	9	100	100	88.2	100
Week avg		100	100	88.2	100
5	12	99.5	100	95.1	100
5	13	97.8	100	97.8	b/
5	16	100	100	100	100
Week avg		99.1	100	97.6	100
5	19	97.8	100	80.5	100
5	20	99.2	96.5	93.8	100
Week avg		98.5	98.3	87.2	100
6	30	80.7	100	98.0	98.7
7	1	100	98.3	97.9	100
7	2	100	91.7	82.0	100
7	3	100	100	95.1	100
Week avg		95.2	97.5	93.3	99.7
7	7	100	97.8	98.9	100
7	8	100	99.1	99.6	98.3
7	9	100	98.8	100	100
7	10	98.5	99.3	92.9	100
7	11	89.9	100	87.7	100
Week avg		97.7	99.0	95.8	99.7

Table 8-31. (Continued)

Daily samples Date 1975 Month	Day	Smaller than 38.1 mm 51 Mill discharge	 52 Cyclone discharge	 55 Magnetic belt rejects	 58 Ferrous metal by-products
7	15	98.0	100	93.6	100
7	16	99.2	95.0	96.7	100
7	17	100	93.8	100	100
7	18	100	99.1	100	100
Week avg		99.3	97.0	5	100
7	29	100	99.0	100	100
8	1	95.0	98.6	100	100
Week avg		97.5	98.7	100	100
8	5	76.3	98.1	100	100
8	6	98.7	98.1	93.7	100
8	7	99.2	99.2	92.5	100
8	8	98.2	100	100	100
Week avg		93.1	98.6	96.6	100
8	11	94.9	98.7	86.8	100
8	14	98.6	100	95.8	100
8	15	100	100	100	100
Week avg		97.8	99.6	94.2	100
8	19	99.0	94.5	86.6	100
8	20	86.6	99.3	100	100
8	21	99.6	100	100	100
8	22	100	100	92.5	100
Week avg		96.3	98.5	94.7	100
8	28	100	100	97.3	100
8	29	100	99.2	97.0	100
Week avg		100	99.6	97.2	100
9	2	97.2	96.9	86.7	100
9	3	100	98.6	79.5	98.5
9	4	99.7	99.1	95.5	100
9	5	96.5	98.0	93.8	100
Week avg		98.4	98.2	88.9	99.6
Total average a/		96.2	95.0	91.9	99.6

Table B-31. (Continued)

Daily samples Date 1974 Month	Day	Smaller than 19.1 mm 51 Mill discharge	52 Cyclone discharge	54 ADS heavies	55 Magnetic belt rejects	56 Nuggetizer feed	58 Ferrous metal by-products
9	23	57.9	71.6	16.8	59.9	1.9	85.6
9	24	71.5	82.3	20.7	71.3	11.8	46.9
9	25	37.0	60.2	16.6	60.0	18.6	58.6
9	26	63.1	68.6	17.6	65.4	2.5	65.5
9	27	66.3	73.5	28.1	67.9	8.3	59.6
Week avg		59.2	71.2	19.5	64.9	8.6	63.2
9	30	77.3	86.5	17.6	55.6	12.3	61.0
10	1	65.9	84.7	26.7	47.8	11.1	60.4
10	2	86.7	81.6	39.0	59.7	10.7	47.7
10	3	61.3	86.5	21.7	50.0	26.0	53.2
10	4	71.6	79.1	48.6	77.3	6.9	50.3
Week avg		72.1	83.7	30.7	58.1	13.4	54.6
10	7	57.5	74.7		65.4		56.4
10	8	86.6	82.8		71.9		63.2
10	9	83.3	83.9		80.0		39.6
10	10	50.0	78.1		77.1		45.0
10	11	82.6	70.3		82.2		49.0
Week avg		71.6	78.0		75.3		50.6
10	15	83.1	86.9		82.9		66.0
10	16	87.6	81.2		95.0		50.1
10	17	72.6	78.9		75.2		39.0
10	18	68.7	80.6		66.6		64.0
Week avg		78.0	81.9		79.9		54.8
10	21	76.8	68.5		41.3		53.7
10	22	60.2	69.5		66.1		60.4
10	23	75.7	86.8		62.1		61.2
10	24	67.3	69.1		72.6		58.5
10	25	84.1	74.7		66.2		49.8
Week avg		72.8	73.3		61.7		57.1
11	18	86.0	75.2		59.6		50.0
11	19	61.7	55.1		86.2		45.2
11	20	65.8	67.0		66.6		55.9
11	21	82.7	66.1		65.7		42.2
11	22	53.9	66.6		60.0		49.2
Week avg		70.0	65.6		67.7		48.5

Table 9-31. (Continued)

	Smaller than 19.1 mm			
Weekly composite (1974)	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S8 Ferrous metal by-products
11-25	75.6	61.1	63.7	59.9
12-2	69.3	65.3	53.1	55.0
12-9	68.6	62.0	68.7	52.7
12-30	59.2	61.9	70.9	63.5
(1975)				
1-6	76.5	64.5	8.3	60.3
1-13	55.7	69.9	64.3	62.8
1-20	67.9	66.2	59.3	57.5
1-27	71.6	50.0	37.0	62.0
2-3	36.6	63.5	80.0	55.2
2-10	72.0	76.3	56.0	52.3
2-17	55.5	37.3	52.1	31.6
3-3	58.5	67.0	65.1	55.5
3-10	77.1	62.0	66.9	59.3
3-17	75.3	84.7	59.2	62.8

Daily samples Date 1975 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S8 Ferrous metal by-products
5	24	72.9	77.8	67.3	45.6
5	25	71.1	56.7	56.0	58.6
5	26	66.8	62.3	63.8	52.7
5	27	72.6	78.7	71.9	67.6
5	28	56.5	69.9	71.3	73.9
5	29	70.7	79.9	72.1	59.8
Week avg		70.1	70.5	66.7	59.7
5	31	50.3	63.6	50.3	59.4
6	1	76.3	59.7	73.6	57.7
6	2	66.2	82.9	72.8	57.7
6	3	76.3	63.2	76.3	57.5
6	6	56.1	77.3	56.7	62.6
Week avg		63.8	69.3	63.5	55.1
6	7	70.5	61.7	83.9	68.6
6	8	60.8	76.8	75.6	52.3
6	9	57.0	52.5	69.2	53.6
6	10	61.6	76.6	60.8	58.2
6	11	85.3	66.5	50.3	39.1
6	12	63.9	73.7	60.5	50.0
Week avg		67.1	68.0	68.3	50.0

Table B-31. (Continued)

Daily samples Date 1975 Month	 Day	smaller than 19.1 mm S1 Mill discharge	 S2 Cyclone discharge	 S5 Magnetic belt rejects	 S8 Ferrous metal by-products
4	14	77.9	73.1	92.3	56.5
4	15	73.1	73.9	47.2	54.2
4	16	79.2	80.9	39.7	45.3
Week avg		76.7	76.0	59.7	52.0
4	18a/	75.1	72.8	87.6	b/
4	19a/	98.6	68.8	91.3	95.1
4	21a/	96.0	100.0	96.1	99.2
4	22a/	93.7	98.2	95.1	91.3
4	23a/	99.1	99.5	88.5	88.1
Week avg		93.1	87.9	91.7	93.4
4	28	86.1	88.7	62.6	58.6
4	29	91.0	89.7	73.3	47.0
4	30	90.1	75.9	68.8	38.3
5	1	78.3	77.6	63.7	43.3
5	2	93.6	83.6	60.0	59.1
Week avg		87.8	83.1	65.7	49.3
5	9	92.3	96.5	56.6	75.8
Week avg		92.3	96.5	56.6	75.8
5	12	90.2	89.3	73.9	66.5
5	13	92.0	92.7	53.6	b/
5	16	87.2	94.9	76.9	60.1
Week avg		89.8	92.3	68.1	63.3
5	19	92.6	96.5	40.6	68.0
5	20	93.6	87.2	73.6	58.9
Week avg		93.1	91.9	57.0	63.5
6	30	64.6	92.2	72.5	52.0
7	1	91.6	87.6	60.7	63.5
7	2	85.8	85.3	41.6	67.7
7	3	78.8	86.2	72.6	59.8
Week avg		80.2	87.8	61.8	60.8
7	7	90.3	88.3	59.9	58.5
7	8	90.8	94.7	62.3	51.3
7	9	88.5	81.6	63.6	57.2
7	10	82.5	81.6	63.0	62.5
7	11	82.3	93.8	55.1	53.5
Week avg		86.9	88.0	61.9	56.6

Table A-31. (Continued)

Daily samples Date 1975		Smaller than 19.1 mm			
Month	Day	51 Mill discharge	52 Cyclone discharge	55 Magnetic belt rejects	58 Ferrous metal by-products
7	15	82.7	86.2	83.1	5[illegible].5
7	16	85.0	71.0	69.6	59.9
7	17	77.0	52.3	41.0	67.1
7	18	93.6	81.9	69.5	43.0
Week avg		84.6	72.9	65.8	55.9
7	30	93.2	84.1	62.2	61.6
8	1	83.8	70.6	58.2	51.6
Week avg		88.5	77.3	60.2	56.5
8	5	57.2	67.3	81.4	65.0
8	6	69.6	72.1	70.3	56.8
8	7	66.5	80.3	61.8	64.9
8	8	78.6	74.5	63.8	66.1
Week avg		68.0	73.6	69.3	63.2
8	11	73.2	77.3	58.6	58.7
8	14	89.0	61.3	65.7	[illegible]6.8
8	15	73.3	89.1	76.7	53.0
Week avg		78.5	75.9	67.0	5[illegible].0
8	19	67.9	85.8	74.6	56.2
8	20	63.2	82.0	76.7	69.8
8	21	75.2	93.2	72.2	53.6
8	22	93.3	81.5	51.7	53.0
Week avg		74.9	85.6	68.8	58.2
8	28	90.4	95.1	54.0	55.8
8	29	75.0	84.0	77.1	57.0
Week avg		82.7	89.6	65.6	55.5
9	2	91.2	88.9	61.5	58.6
9	3	77.7	85.3	41.0	50.9
9	4	67.5	65.2	59.8	60.0
9	5	73.2	89.3	50.2	56.2
Week avg		77.4	82.2	53.1	56.4
Total average[a/]		73.1	71.5	61.5	57.6

Table B-31. (Continued)

Daily samples Date 1974 Month	Day	Smaller than 9.5 mm 51 Mill discharge	 52 Cyclone discharge	 54 ADS heavies	 55 Magnetic belt rejects	 56 Nuggetizer feed	 58 Ferrous metal by-products
9	23	53.1	50.0	5.5	29.9	0.7	14.6
9	24	50.5	58.3	7.0	35.3	0.9	6.5
9	25	22.6	38.8	6.6	26.0	0.8	5.7
9	26	39.9	65.3	6.7	69.2	0.5	9.6
9	27	47.8	63.6	11.0	28.1	0.6	11.0
Week avg		38.7	57.6	6.6	35.7	0.7	9.6
9	30	57.7	66.7	17.1	27.5	2.2	9.9
10	1	46.6	62.1	11.5	21.6	1.3	8.5
10	2	52.5	55.8	11.1	16.0	0.6	6.6
10	3	30.6	62.7	6.6	22.6	1.6	7.7
10	4	63.8	67.7	15.7	63.3	1.0	2.9
Week avg		45.1	58.6	12.2	29.2	1.3	7.1
10	7	35.9	50.5	52.2	52.2		13.1
10	8	51.6	60.0	60.1	60.1		10.8
10	9	51.2	58.1	65.1	65.1		2.9
10	10	35.0	51.8	42.6	42.6		4.3
10	11	55.1	46.1	28.6	28.6		3.1
Week avg		45.8	53.3	51.7	51.7		6.8
10	15	58.5	66.1		65.7		10.7
10	16	61.8	55.7		50.5		2.1
10	17	50.0	55.0		19.0		6.8
10	18	46.5	53.3		10.2		11.6
Week avg		55.2	57.6		38.4		7.8
10	21	55.3	53.5		29.6		11.2
10	22	37.3	66.1		40.3		12.6
10	23	67.3	55.7		29.1		5.3
10	24	39.6	55.7		36.5		6.5
10	25	56.1	57.1		25.2		4.9
Week avg		47.1	57.7		32.0		7.9
11	18	53.2	39.7		33.3		7.3
11	19	39.6	35.6		68.5		11.0
11	20	38.2	37.7		35.1		5.8
11	21	59.6	38.0		26.2		2.0
11	22	31.2	39.1		28.3		3.0
Week avg		47.3	39.7		35.6		5.8

Table 8-31. (Continued)

Weekly composite (1974)		S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S8 Ferrous metal byproducts
		Smaller than 9.5 mm			
11-25		44.2	38.9	37.2	11.6
12-2		37.5	38.9	18.7	4.9
12-9		31.5	30.6	35.5	6.0
12-30		35.0	35.8	36.3	3.5
(1975)					
1-6		46.9	37.8	2.7	13.0
1-13		25.3	35.0	13.9	16.2
1-20		33.3	33.7	20.6	8.0
1-27		52.8	36.5	14.5	7.2
2-3		21.6	36.5	41.9	15.1
2-10		43.0	13.5	26.6	8.0
2-17		39.9	27.7	26.7	4.8
3-3		36.9	18.0	15.6	10.0
3-10		45.6	29.3	31.5	8.5
3-17		49.3	59.3	26.6	12.8
Daily samples Date 1975					
Month	Day				
3	24	50.3	53.7	31.1	7.0
3	25	33.0	61.6	28.6	10.5
3	26	46.9	47.9	20.2	5.7
3	27	47.0	68.1	37.1	16.2
3	28	55.7	58.1	17.6	18.5
3	29	40.5	60.0	44.1	13.8
Week avg		45.5	58.0	33.8	13.3
3	31	31.5	46.1	36.5	8.5
4	1	46.9	35.6	43.6	11.8
4	2	46.1	64.2	50.2	11.8
4	3	56.9	50.6	40.8	12.6
4	4	32.2	51.3	18.9	3.8
Week avg		43.3	50.6	35.6	9.7
4	7	50.3	65.2	44.0	10.2
4	8	42.6	49.6	35.0	10.4
4	9	39.5	42.0	37.5	11.3
4	10	42.5	23.6	31.8	6.3
4	11	59.5	67.5	25.1	4.8
4	12	52.0	55.3	23.9	7.8
Week avg		47.8	51.8	33.1	8.5

Table B-31. (Continued)

Daily samples Date 1975 Month	Day	Smaller than 9.5 mm 31 Mill discharge	 32 Cyclone discharge	 33 Magnetic belt rejects	 38 Ferrous metal byproducts
5	13	55.9	59.8	53.7	16.6
5	15	51.0	58.1	21.1	5.9
5	16	51.2	51.6	22.5	8.2
Week avg		52.6	59.8	29.7	10.2
5	19a/	75.1	72.3	56.0	b/
5	20a/	59.7	80.3	59.5	15.1
5	21a/	58.0	77.3	66.8	51.9
5	22a/	67.7	70.3	61.7	62.7
5	23a/	79.5	80.5	62.3	49.5
Week avg		65.7	75.0	60.9	39.6
5	28	60.1	65.1	27.3	8.8
5	29	63.0	66.5	40.7	6.7
5	30	65.5	55.3	37.6	3.6
6	1	58.9	50.8	38.8	5.5
6	2	65.9	50.0	33.5	9.6
Week avg		61.1	57.9	35.6	6.7
6	3	69.6	68.1	23.5	16.1
Week avg		69.6	68.1	23.5	16.1
6	12	60.1	71.7	19.0	12.9
6	11	57.6	76.5	20.9	b/
6	16	63.3	75.9	50.6	10.6
Week avg		61.7	73.8	35.5	11.9
6	19	61.3	50.5	9.0	7.0
6	20	73.6	63.6	40.6	8.6
Week avg		67.5	57.1	24.7	7.7
6	30	51.3	61.0	37.8	7.5
7	1	63.5	67.2	30.2	12.4
7	2	57.5	55.2	16.0	15.8
7	3	51.7	60.2	30.2	2.6
Week avg		53.5	61.9	29.6	9.7
7	7	63.9	66.5	22.8	6.5
7	8	70.0	50.3	23.7	6.1
7	9	59.8	67.8	24.8	3.6
7	10	57.7	57.6	36.7	9.0
7	11	69.3	75.8	23.5	10.3
Week avg		64.1	63.6	25.3	6.7

Table 8-31. (Continued)

Daily samples Date 1975 Month	Day	Smaller than 9.5 mm S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S8 Ferrous metal by-products
7	15	51.9	57.9	55.1	7.1
7	16	58.3	48.0	29.1	15.7
7	17	52.2	35.6	18.0	6.2
7	18	63.6	50.0	37.2	2.7
Week avg		56.7	47.8	32.5	8.0
7	30	52.2	55.6	26.5	10.0
8	1	53.3	50.1	28.2	8.5
Week avg		53.8	52.8	25.3	9.2
8	5	34.8	44.0	41.8	13.3
8	6	48.7	53.5	40.6	10.5
8	7	39.1	56.5	37.9	10.6
8	8	52.7	53.3	28.3	11.8
Week avg		43.8	51.3	36.6	11.5
8	13	46.5	50.0	22.9	5.3
8	14	61.8	44.6	15.0	6.6
8	15	53.9	63.7	30.5	10.0
Week avg		53.4	52.6	22.6	7.3
8	19	36.8	63.0	50.5	5.2
8	20	43.7	58.1	50.0	12.6
8	21	59.7	77.9	42.5	9.2
8	22	73.3	60.3	23.6	8.0
Week avg		50.9	58.6	36.6	8.7
8	28	68.5	76.3	27.0	7.6
8	29	51.9	53.6	29.5	6.3
Week avg		60.2	65.0	28.3	7.0
9	2	66.3	66.8	28.9	13.3
9	3	56.7	60.9	16.2	6.8
9	4	33.6	53.8	30.0	16.6
9	5	60.6	69.3	29.5	9.3
Week avg		54.3	62.7	26.2	11.0
Total average[c/]		53.7	57.3	30.8	9.3

Table B-31: (Continued)

Daily samples Date 1975 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S4 ABS heavies	S5 Magnetic belt rejects	S6 Nuggetizer feed	S8 Ferrous metal by-products
		Smaller than 4.7 mm					
9	23	15.1	36.3	1.9	10.0	0.8	0.9
9	24	13.5	40.6	1.9	12.1	0.1	0.3
9	25	12.5	23.1	2.1	6.9	0.6	1.1
9	26	21.8	29.5	1.1	17.1	0.3	0.5
9	27	15.7	18.8	3.3	15.2	0.3	1.9
Week avg		25.2	31.1	2.1	12.1	0.6	1.0
9	30	31.6	47.6	5.6	7.9	0.5	0.7
10	1	28.6	50.1	2.8	7.6	0.3	0.6
10	2	32.3	36.0	3.7	16.8	0.3	0.6
10	3	11.7	40.0	1.6	7.6	0.6	0.1
10	6	15.3	22.9	6.9	13.1	0.3	0.3
Week avg		23.7	38.1	3.9	10.7	0.5	0.5
10	7	22.2	35.3		23.6		0.9
10	8	13.0	19.0		13.9		1.5
10	9	29.8	13.3		17.8		0.3
10	10	26.6	35.9		16.1		0.6
10	11	29.2	19.5		9.5		0.2
Week avg		28.2	16.2		16.2		0.8
10	15	17.7	15.0		21.5		0.0
10	16	17.1	16.5		16.9		0.1
10	17	29.2	35.0		12.7		0.3
10	18	28.3	32.6		5.6		0.8
Week avg		33.1	36.9		13.6		0.5
10	21	17.5	27.2		8.0		0.9
10	22	21.7	28.8		15.3		0.8
10	23	12.6	35.6		13.6		0.6
10	24	25.7	30.9		12.9		1.1
10	25	3[illegible].1	31.0		12.5		0.3
Week avg		30.1	30.7		12.2		0.8
11	18	30.8	30.8		13.5		0.7
11	19	23.6	21.8		16.8		1.0
11	20	27.1	21.9		11.6		0.5
11	21	26.4	23.9		8.0		0.2
11	22	18.2	21.7		10.0		0.2
Week avg		25.1	24.0		11.9		0.5

Table [illegible] (continued)

Weekly composite sample	Mill discharge	Cyclone discharge	Magnetic belt discharge	Ferrous metal byproducts
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily sample				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg	[illegible]	[illegible]	[illegible]	[illegible]

Table B-31. (Continued)

Daily samples date 1975 Month	Day	Smaller than 4.8 mm S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S8 Ferrous metal by-products
5	16a/	57.8	51.7	22.3	b/
5	19a/	58.7	45.1	17.3	1.2
5	21a/	30.7	48.2	29.5	1.3
5	22a/	60.1	49.7	5.1	1.7
5	23a/	51.6	59.5	8.8	2.4
Week avg		51.8	51.1	16.6	1.7
5	28	38.7	31.3	6.3	1.5
5	29	40.2	43.0	16.6	0.7
5	30	38.7	33.6	12.3	0.3
6	1	27.3	33.3	16.1	0.2
6	2	42.0	38.3	9.1	0.4
Week avg		37.5	36.9	11.7	0.7
6	9	40.7	48.2	5.7	1.5
Week avg		40.7	48.2	5.7	1.5
6	12	36.6	49.7	13.3	0.9
6	13	42.0	51.8	6.6	b/
6	16	42.5	54.0	21.8	1.0
Week avg		40.3	51.8	13.8	1.0
6	19	39.6	38.6	3.6	0.6
6	20	48.0	43.7	13.7	0.8
Week avg		43.8	41.1	8.7	0.7
6	30	29.9	43.3	18.6	1.1
7	1	40.7	47.9	10.6	1.3
7	2	17.5	39.1	3.1	1.3
7	3	35.6	45.3	13.2	0.9
Week avg		30.9	44.0	11.4	1.2
7	7	43.3	47.6	16.1	2.0
7	8	45.6	35.1	8.2	0.8
7	9	37.7	46.6	6.3	0.6
7	10	35.1	39.2	13.3	1.1
7	11	45.8	53.0	4.5	0.9
Week avg		41.5	44.3	9.7	1.0

Table B-31. (Continued)

Daily samples Date 1975 Month	Day	Smaller than 4.8 mm S1 Mill discharge	 S2 Cyclone discharge	 S5 Magnetic belt rejects	 S8 Ferrous metal by-products
7	15	29.5	41.2	14.9	0.5
7	16	38.5	34.0	5.1	0.8
7	17	32.7	23.9	3.6	0.6
7	18	40.8	21.9	11.1	0.3
Week avg		35.4	32.8	8.5	0.6
7	30	33.6	38.6	6.3	0.3
8	1	35.4	33.2	8.0	1.3
Week avg		34.5	35.9	7.2	0.8
8	5	21.6	28.5	16.6	1.0
8	6	30.3	38.8	18.5	0.5
8	7	25.8	36.8	7.8	1.7
8	8	28.2	35.1	3.6	0.9
Week avg		26.5	36.3	11.6	1.0
8	11	22.3	32.7	6.1	0.4
8	12	38.8	33.3	14.6	0.8
8	13	31.1	37.6	13.1	1.2
Week avg		30.7	34.5	11.3	0.8
8	19	25.6	41.2	13.9	0.7
8	20	26.4	38.2	16.0	1.5
8	21	31.2	49.2	12.6	0.9
8	22	42.0	28.9	6.7	1.1
Week avg		31.3	39.4	12.3	1.1
8	28	44.5	53.6	11.6	0.7
8	29	31.5	35.0	11.0	0.7
Week avg		38.0	44.3	11.3	0.7
9	2	42.8	46.6	9.2	1.8
9	3	36.7	62.7	6.5	0.5
9	4	21.8	38.7	7.1	1.0
9	5	28.7	49.3	9.0	0.6
Week avg		32.5	49.3	7.9	1.2
Total average[b]		29.1	38.8	9.7	1.0

Table B-31. (Continued)

		Smaller than 2.0 mm					
Daily samples Date 1973 Month	Day	31 Mill discharge	32 Cyclone discharge	34 AE3 heavies	35 Magnetic belt rejects	36 Densified feed	38 Ferrous metal by-product
9	23	15.6	22.2	1.3	3.8	0.2	0.3
9	24	21.5	25.1	1.0	5.5	0.1	0.2
9	25	8.1	11.6	1.2	1.1	0.2	0.1
9	26	15.3	21.1	0.6	0.5	0.1	0.1
9	27	11.3	12.2	1.3	1.2	0.1	1.0
Week avg		14.2	20.0	1.1	3.0	0.1	0.2
9	30	12.5	29.5	3.0	2.7	0.2	0.1
10	1	18.2	25.0	1.0	4.6	0.1	0.2
10	2	19.6	22.1	1.5	6.1	0.2	0.2
10	3	0.9	27.1	2.1	4.5	0.2	0.1
10	4	1.0	18.0	2.0	5.1	0.2	0.2
Week avg		11.6	24.5	1.7	5.0	0.2	0.2
10	7	15.5	24.2		12.0		0.3
10	8	20.9	26.7		5.0		0.1
10	9	17.0	21.5		2.2		0.2
10	10	18.5	25.3		5.3		0.2
10	11	19.2	21.8		3.1		0.1
Week avg		18.1	23.5		6.0		0.2
10	15	21.1	22.2		9.6		0.2
10	16	22.5	20.3		5.2		0.2
10	17	17.5	22.5		8.3		0.2
10	18	18.8	24.2		2.2		0.2
Week avg		20.0	23.0		5.3		0.2
10	21	25.1	19.0		3.5		0.1
10	22	15.7	20.3		5.6		0.2
10	23	27.0	25.3		7.3		0.1
10	24	18.5	22.7		5.7		0.1
10	25	21.2	21.8		3.0		0.1
Week avg		21.0	21.8		5.3		0.1
11	18	19.6	22.2		9.2		0.1
11	19	12.0	15.1		6.2		0.3
11	20	13.1	15.0		3.8		0.2
11	21	19.5	16.1		3.0		0.1
11	22	13.0	13.0		3.5		0.1
Week avg		15.0	16.1		5.5		0.2

Table B-31. (Continued)

		Smaller than 2.4 mm			
Weekly composite (1974)		S1 Mill discharge	S2 Cyclone discharge	S3 Magnetic belt rejects	S8 Ferrous metal by-product
11-25		16.1	19.6	5.3	0.3
12-2		15.8	15.3	4.2	0.1
12-9		11.8	16.5	5.1	0
12-30		11.5	16.5	4.7	0
(1975)					
1-6		13.7	15.5	0.9	0.1
1-13		8.8	13.3	1.8	0.1
1-20		11.1	12.5	1.5	0
1-27		10.5	12.5	0.7	0
2-3		7.7	9.6	2.2	0.2
2-10		16.0	8.1	2.0	0.1
2-17		15.1	9.7	3.0	0.1
3-3		15.5	7.0	2.3	0.2
3-10		10.1	12.0	3.5	0.1
3-17		15.5	27.1	3.0	0.5
Daily samples Date 1975					
Month	Day				
4	24	23.2	30.5	5.6	0.2
4	25	20.3	23.9	7.3	0.2
4	26	22.0	26.8	5.8	0.0
4	27	11.1	16.0	5.6	0.2
4	28	19.1	20.7	6.8	0.2
4	29	15.6	18.3	5.8	0.6
Week ave		18.5	22.7	5.5	0.2
4	30	11.7	17.3	11.7	0.1
5	1	18.5	18.2	5.7	0.2
5	2	18.2	9.6	6.0	0.2
5	5	18.5	25.8	5.9	0.1
5	6	12.3	21.0	3.0	0.0
Week ave		15.8	18.6	6.1	0.1
5	7	21.7	19.3	8.1	0.2
5	8	18.8	19.2	6.5	0.1
5	9	16.2	21.0	6.9	0.2
5	10	17.2	10.8	6.6	0.0
5	11	26.7	23.0	1.2	0.1
5	12	29.3	25.0	3.0	0.2
Week ave		21.1	19.8	5.9	0.1

Table 6-31. (Continued)

Daily samples Date 1975 Month	Day	Smaller than 2.5 mm 31 Mill discharge	32 Cyclone discharge	15 Magnetic belt rejects	58 Ferrous metal byproducts
5	14	15.6	20.0	9.0	0.3
5	15	22.8	20.0	5.6	0.3
5	16	20.0	21.8	3.3	0.1
Week avg		19.5	20.6	6.0	0.2
5	18a/	31.7	39.8	7.0	b/
5	19a/	27.5	31.7	5.9	0.5
5	21a/	30.7	36.7	11.7	0.2
5	22a/	26.7	37.0	5.2	0.3
5	23a/	32.1	36.3	1.1	0.3
Week avg		29.7	36.3	6.0	0.3
5	28	25.0	26.3	2.6	0.2
5	29	25.9	30.6	6.6	0.2
5	30	23.9	22.6	6.9	0.0
6	1	16.9	22.6	6.8	0.1
6	2	27.3	21.6	3.3	0.0
Week avg		23.8	24.7	5.2	0.1
6	9	25.2	33.3	4.0	0.0
Week avg		25.2	33.3	4.0	0.0
6	12	22.0	31.1	5.3	0.1
6	13	26.1	33.5	2.5	b/
6	16	27.0	37.2	9.3	0.2
Week avg		25.0	33.9	5.7	0.2
6	19	27.6	25.8	1.8	0.1
6	20	29.5	30.7	4.3	0.3
Week avg		28.6	28.3	3.1	0.2
6	30	23.6	28.9	8.6	0.5
7	1	26.3	32.8	6.3	0.2
7	2	25.8	27.9	7.9	0.3
7	3	23.2	33.3	6.6	0.3
Week avg		24.7	30.7	7.4	0.3
7	7	28.7	29.9	5.6	0.5
7	8	27.5	21.8	3.5	0.1
7	9	25.0	29.3	3.0	0.1
7	10	23.7	26.6	6.5	0.1
7	11	33.5	38.0	3.2	0.2
Week avg		27.7	29.1	4.4	0.2

Table 8-31. (Concluded)

Daily samples Date 1975 Month	 Day	Smaller than 2.5 mm 51 Mill discharge[a]	 52 Cyclone discharge[b]	 55 Magnetic belt rejects	 58 Ferrous metal by-products
7	15	17.0	26.0	6.6	0.2
7	16	25.1	23.0	1.1	0.1
7	17	19.6	16.2	1.3	0.2
7	18	23.9	19.8	3.9	0.1
Week avg		21.4	21.3	3.2	0.2
7	31	20.3	26.7	2.0	0.2
8	1	21.9	23.0	2.6	0.1
Week avg		21.1	24.9	2.2	0.1
8	5	15.5	19.0	4.7	0.2
8	6	17.0	26.8	8.2	0.1
8	7	15.6	19.6	2.5	0.6
8	8	13.1	21.2	3.1	0.2
Week avg		15.3	21.2	4.6	0.3
8	11	12.1	22.7	2.3	0.7
8	14	22.0	22.6	6.6	0.4
8	15	20.7	22.0	4.6	0.4
Week avg		18.3	22.4	4.5	0.3
8	19	18.5	23.6	4.1	0.1
8	20	15.1	22.4	4.7	0.4
8	21	19.7	30.5	5.1	0.3
8	22	23.9	19.4	3.1	0.4
Week avg		19.0	24.0	4.0	0.4
8	28	25.8	31.9	6.7	0.2
8	29	17.9	21.6	4.6	0.2
Week avg		21.9	26.8	5.7	0.2
9	2	26.9	28.8	3.2	0.4
9	3	22.3	27.3	1.9	0.2
9	4	15.1	26.0	1.7	0.4
9	5	20.3	30.6	2.2	0.2
Week avg		20.9	28.2	2.3	0.3
Total average[c]		18.5	20.6	3.9	0.2

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a/ Fine grind.
b/ Nuggetizer feed.
c/ Average includes weekly composites November 25, 1974, through March 17, 1975.

Table B-3c: ANALYSIS OF MILLED REFUSE STREAMS PARTICLE SIZE
GEOMETRIC MEAN DIAMETER : mm, wt. %
(Received moisture basis)

Daily samples Date 1977 Month	Day	01 Mill discharge	02 Cyclone discharge	04 ADS heavies	05 Magnetic belt rejects	06 Hoggalizer feed	08 Ferrous metal byproducts
9	23	7.1	7.9	22.9	16.0	31.5	13.5
9	24	8.1	5.6	23.6	13.5	26.8	19.1
9	25	10.1	11.9	21.5	16.0	26.8	17.0
9	26	10.7	9.7	25.1	10.9	31.2	18.0
9	27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		11.9	9.0	20.7	12.6	28.9	18.7
9	30	7.5	5.6	21.1	11.7	25.6	16.5
10	1	9.1	6.6	20.3	16.8	29.5	16.8
10	2	7.5	6.9	19.1	13.0	30.7	18.3
10	3	17.2	8.1	21.3	18.5	26.1	17.6
10	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		9.8	6.7	20.0	15.1	27.1	17.5
10	7	10.9	7.1		10.6		16.9
10	8	7.6	6.1		10.9		15.0
10	9	7.0	7.1		9.6		20.6
10	10	11.7	7.1		10.2		19.1
10	11	[illegible]	[illegible]		[illegible]		[illegible]
Week avg		9.1	7.5		10.8		18.0
10	15	6.7	5.6		8.9		18.0
10	16	6.1	7.1		8.5		18.8
10	17	8.6	7.1		10.9		19.6
10	18	[illegible]	[illegible]		[illegible]		[illegible]
Week avg		7.7	6.8		10.9		18.5
10	21	7.1	9.5		17.0		17.0
10	22	10.7	8.9		15.2		16.5
10	23	8.1	6.9		15.5		16.8
10	24	7.7	8.6		15.5		17.0
10	25	[illegible]	[illegible]		[illegible]		[illegible]
Week avg		8.5	8.5		15.5		17.1
11	18	7.6	8.1		13.0		18.0
11	19	11.2	11.9		9.1		18.3
11	20	11.2	10.5		12.7		18.0
11	21	7.9	10.6		13.6		20.1
11	22	[illegible]	[illegible]		[illegible]		[illegible]
Week avg		9.8	10.3		13.3		18.7

Table B-3u. (Continued)

Weekly composite (1974)	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S8 Ferrous metal by-products
11:25	9.7	11.2	13.0	16.5
12:2	10.2	10.6	15.2	19.1
12:9	11.9	11.6	11.2	18.0
12:30	11.7	10.9	12.7	17.0
(1975)				
1:6	8.8	10.6	18.9	16.0
1:13	15.2	10.7	17.5	15.8
1:20	11.2	11.2	11.5	17.3
1:27	8.1	12.5	23.1	16.8
2:3	16.0	13.2	10.7	16.5
2:10	9.7	16.0	15.1	18.0
2:17	10.9	16.5	16.8	21.3
3:3	10.9	15.2	17.3	17.0
3:10	7.1	16.0	13.0	17.0
3:17	7.6	8.6	16.5	15.8

Daily samples (date 1975) Month	Day	S1 Mill discharge	S2 Cyclone discharge	S5 Magnetic belt rejects	S8 Ferrous metal by-products
3	24	7.9	7.1	13.0	18.5
3	25	9.1	10.3	16.5	15.8
3	26	8.6	8.6	13.3	18.0
3	27	9.7	8.6	11.7	15.0
3	28	10.5	9.1	11.9	15.0
3	29	9.1	8.6	10.9	16.0
Week avg		9.1	8.8	12.5	16.3
3	31	11.2	9.7	13.5	16.8
4	1	8.6	10.6	10.1	16.8
4	2	9.1	8.6	11.1	16.8
4	3	8.6	8.1	10.9	16.3
4	4	12.3	7.6	18.0	18.0
Week avg		10.1	8.9	12.9	17.3
4	7	8.1	9.6	9.5	18.0
4	8	9.7	8.1	11.7	17.3
4	9	10.7	10.7	11.7	17.0
4	10	10.2	11.7	13.2	17.3
4	11	8.6	8.6	16.3	20.1
4	12	7.6	7.6	16.3	18.3
Week avg		9.9	9.3	12.5	18.0

Table B-3b. (continued)

Cycle samples date 1975 Month	Day	31 Mill discharge	32 Cyclone discharge	35 Magnetic belt rejects	38 Ferrous metal byproduct
[illegible]	15	7.1	8.1	8.9	16.0
[illegible]	15	8.1	8.9	16.9	17.8
[illegible]	16	7.4	7.5	16.5	12.1
[illegible] avg		7.8	8.1	13.1	17.6
[illegible]	16b/	5.6	4.3	8.1	b/
[illegible]	17b/	7.6	4.8	8.6	17.2
[illegible]	18b/	6.1	4.6	6.6	9.3
[illegible]	19b/	[illegible]	5.6	4.9	10.3
[illegible]	21b/	[illegible]	3.8	10.1	[illegible]
[illegible] avg		[illegible]	5.5	7.7	10.6
[illegible]	28	6.5	5.8	13.7	16.3
[illegible]	29	5.5	9.6	10.7	18.5
[illegible]	30	6.1	7.9	11.5	20.3
[illegible]	1	8.1	8.1	11.2	19.1
[illegible]	2	5.3	9.2	13.0	18.8
[illegible] avg		6.1	8.3	12.5	18.1
[illegible]	3	3.1	6.8	18.0	19.7
[illegible] avg		5.1	6.8	18.0	15.7
[illegible]	12	6.3	3.1	12.2	15.9
[illegible]	13	5.6	4.6	15.1	b/
[illegible]	16	5.1	3.2	9.1	16.3
[illegible] avg		6.7	3.7	12.1	16.1
[illegible]	19	5.5	8.1	11.1	b/
[illegible]	[illegible]	3.0	3.8	11.2	15.1
[illegible] avg		5.5	6.1	16.2	15.1
[illegible]	[illegible]	10.[illegible]	7.1	10.6	17.2
[illegible]	[illegible]	1.8	9.3	11.1	19.4
[illegible]	[illegible]	1.6	6.2	20.1	13.0
[illegible]	[illegible]	3.5	3.6	11.8	14.2
[illegible] avg		7.3	5.8	13.8	16.5
[illegible]	7	5.6	5.6	13.5	17.0
[illegible]	8	5.4	6.6	13.7	18.5
[illegible]	9	6.9	8.1	15.1	17.1
[illegible]	10	7.1	8.6	11.9	18.3
[illegible]	11	8.4	8.3	10.0	12.2
[illegible] avg		9.1	5.8	11.8	17.1

Table B-1c: (concluded)

Daily samples Date 1975 Month	Day	S1 Mill discharge	S2 Cyclone discharge	S3 Magnetic belt inlet	S4 Ferrous metal byproduct
7	15	7.9	8.6	10.2	17.8
7	16	6.5	8.1	11.5	15.8
7	17	7.6	11.7	17.1	16.3
7	18	9.9	7.6	13.5	19.3
Week avg		8.0	9.5	13.1	17.1
7	30	7.1	6.6	13.0	15.1
8	1	7.1	8.1	13.2	[illegible]
Week avg		7.1	7.6	13.0	[illegible]
8	5	12.0	9.1	10.7	[illegible]
8	6	7.6	7.5	13.1	[illegible]
8	7	9.9	7.5	16.7	15.8
8	8	8.1	7.6	13.2	13.8
Week avg	10	10.2	7.9	13.3	15.3
8	11	9.7	7.6	16.1	18.5
8	14	6.5	8.9	11.9	17.5
8	15	8.1	6.1	10.9	17.2
Week avg		8.1	7.5	13.0	17.8
8	19	9.7	6.9	11.3	18.7
8	20	10.5	6.9	9.7	15.0
8	21	9.1	5.6	11.5	17.1
8	22	5.1	8.9	13.8	15.3
Week avg		8.1	6.6	12.3	16.9
8	28	5.6	5.6	18.0	17
8	29	7.0	5.1	11.2	17.1
Week avg		6.3	5.9	17.9	17.1
9	2	5.8	5.6	13.7	10.1
9	3	7.1	6.1	14.1	12.1
9	4	10.9	7.6	15.0	13.7
9	5	11.2	5.3	13.0	12.2
Week avg		8.8	6.2	15.7	10.9
Total avg[c]		8.9	8.3	15.2	16.1

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a/ Fine grind.
b/ Magnetizer down.
c/ Average included weekly average November 25, 1974, through March 17, 1975.

Table B-11. ANALYSIS OF MILLED REFUSE STREAMS
PARTICLE SIZE - GEOMETRIC STANDARD DEVIATION

Daily sample¹ date 1976 Month	Day	51 Mill discharge	52 Cyclone discharge	54 ADS heavies	55 Magnetic belt rejects	56 Nuggetizer feed	58 Ferrous metal by-products
9	23	2.93	2.95	1.59	2.35	1.67	1.69
9	24	3.16	2.71	1.76	2.16	1.33	1.55
9	25	2.99	3.18	1.91	1.95	1.65	1.56
9	26	2.92	3.28	1.67	2.56	1.60	1.56
9	27	3.30	2.88	1.92	2.33	1.52	1.57
Week avg		3.07	3.00	1.77	2.31	1.53	1.56
9	30	2.66	2.69	2.02	2.01	1.65	1.60
10	1	2.91	2.47	1.77	2.26	1.54	1.53
10	2	2.93	2.63	1.85	2.17	1.52	1.56
10	4	3.11	2.71	1.72	2.23	1.57	1.57
10	5	2.63	2.72	1.93	2.42	1.52	1.57
Week avg		2.93	2.69	1.86	2.21	1.58	1.57
10	7	2.72	2.86		2.02		1.68
10	8	2.68	2.78		2.17		1.79
10	9	3.62	2.70		2.20		1.56
10	10	3.18	2.82		2.16		1.52
10	11	2.83	3.03		2.19		1.59
Week avg		2.77	2.84		2.16		1.60
10	15	2.77	2.62		2.20		1.63
10	16	2.56	2.65		1.92		1.58
10	17	2.75	2.82		2.10		1.56
10	18	2.65	2.75		2.23		1.59
Week avg		2.70	2.71		2.06		1.56
10	21	2.86	2.75		2.13		1.61
10	22	3.12	2.63		2.28		1.61
10	23	2.79	2.71		2.00		1.55
10	24	2.85	3.13		2.17		1.55
10	25	2.82	2.82		2.28		1.53
Week avg		2.91	2.81		2.18		1.57
11	18	2.60	2.91		2.05		1.57
11	19	2.79	2.88		2.15		1.67
11	20	2.92	2.82		2.17		1.60
11	21	2.55	2.86		2.13		1.50
11	22	2.68	2.83		2.28		1.51
Week avg		2.69	2.87		2.15		1.58

Table B-3c. (Continued)

Weekly composite (1974)	51 Mill discharge	52 Cyclone discharge	55 Magnetic belt rejects	58 Ferrous metal byproducts
11-25	2.91	3.65	2.58	1.67
12-2	2.68	2.82	1.98	1.57
12-9	2.62	2.70	2.33	1.52
12-30	2.70	2.76	2.95	1.66
(1975)				
1-6	2.56	2.70	1.73	1.68
1-13	2.59	2.51	1.96	1.67
1-20	2.56	2.58	2.08	1.57
1-27	2.91	2.85	2.15	1.53
2-3	2.53	2.67	1.95	1.69
2-10	2.88	3.09	2.03	1.57
2-17	2.83	3.07	2.10	1.56
3-3	2.73	2.57	1.98	1.63
3-10	2.71	3.17	2.17	1.57
3-17	2.97	2.86	2.13	1.65

Daily sample date 1975 Month	Day	51 Mill discharge	52 Cyclone discharge	55 Magnetic belt rejects	58 Ferrous metal byproducts
3	24	2.80	3.09	2.28	1.74
3	25	2.81	3.03	2.63	1.78
3	26	2.95	3.33	2.16	1.51
3	27	2.65	2.87	2.33	1.65
3	28	3.25	3.18	2.19	1.68
3	29	2.80	3.08	2.23	1.67
Week avg		2.86	3.06	2.32	1.64
3	31	2.90	2.83	2.00	1.56
4	1	2.85	3.05	2.71	1.63
4	2	2.76	2.74	1.37	1.65
4	3	2.86	3.16	2.23	1.61
4	4	2.88	2.78	2.08	1.50
Week avg		2.81	2.93	2.39	1.60
4	7	2.94	2.93	2.16	1.53
4	8	2.86	2.76	2.15	1.61
4	9	2.84	3.31	2.26	1.63
4	10	2.86	3.37	2.30	1.53
4	11	2.88	2.98	2.10	1.56
4	12	3.09	2.89	2.21	1.63
Week avg		2.91	2.97	2.18	1.60

Table H/3. (Concluded)

Daily sampling date 1975 Month	Day	11 Mill discharge	12 Cyclone discharge	15 Magnetic belt rejects	16 Ferrous metal byproducts
1	15	2.57	2.87	2.19	1.57
1	16	2.69	3.03	1.91	1.66
1	17	2.64	3.02	1.87	1.51
1	18	2.37	2.88	2.12	1.48
Wk avg		2.58	2.95	2.02	1.56
1	30	3.01	2.77	1.94	1.43
2	3	2.73	2.93	2.13	1.61
Wk avg		2.87	2.86	1.79	1.52
2	5	3.17	2.85	2.06	[illegible]
2	6	2.27	3.06	2.58	[illegible]
2	7	2.32	2.67	2.73	1.64
2	8	[illegible]	2.79	1.93	2.32
Wk avg		[illegible]	2.86	2.18	1.61
2	11	2.65	2.82	2.31	1.56
2	12	2.55	3.05	2.35	1.37
2	13	2.39	2.88	2.00	2.02
Wk avg		2.60	2.78	2.25	1.52
2	19	2.78	2.76	2.39	[illegible]
2	20	3.01	2.69	2.15	1.51
2	21	2.75	2.25	2.13	1.52
2	22	2.38	2.62	2.11	[illegible]
Wk avg		2.73	2.94	2.21	[illegible]
2	26	[illegible]	2.37	2.76	[illegible]
2	27	2.13	2.83	2.08	[illegible]
Wk avg		2.79	2.51	2.17	[illegible]
3	7	2.61	2.69	2.28	1.58
3	[illegible]	2.38	2.95	2.19	[illegible]
3	[illegible]	2.50	3.13	2.08	1.53
3	[illegible]	2.44	2.20	2.21	[illegible]
Wk avg		2.77	2.81	2.18	1.61
Total avg[b]		2.73	2.76	2.11	1.57

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[a] Fine grind.
[b] Average of [illegible] weekly composites [illegible], 1975, through March [illegible], 1975.

Table 6-3w. DAILY RESULTS : PROXIMATE AND ULTIMATE ANALYSIS OF REFUSE FUEL, wt. %
(Received Moisture Basis)

Date 1975 Month	Day	Volatile matter	Fixed carbon	Carbon	Hydrogen	Oxygen (by difference)	Sulfur	Nitrogen
				Stream 51 : Storage bin discharge				
9	23	57.19	5.89	28.66	3.66	19.10	0.21	0.61
9	24	56.77	5.56	26.71	3.66	20.09	0.18	0.61
9	25	57.28	2.93	26.25	3.38	21.88	0.16	0.66
9	26	53.73	11.23	29.86	4.25	20.10	0.21	0.57
9	27	51.93	12.37	29.27	4.13	23.07	0.25	0.57
Week avg		55.05	7.37	27.76	3.79	20.85	0.20	0.61
9	30	55.97	7.98	26.68	3.99	22.76	0.17	0.53
10	1	58.51	0.00	23.65	3.22	20.89	0.15	0.51
10	2	57.23	8.55	28.05	3.57	22.94	0.10	0.57
10	3	56.30	7.80	26.76	3.66	23.03	0.15	0.53
10	6	57.17	9.63	26.83	3.93	25.26	0.20	0.61
Week avg		57.03	6.73	26.35	3.72	22.97	0.15	0.55
				Stream 52: Cyclone discharge				
9	23	58.53	3.23	26.83	3.68	20.55	0.20	0.63
9	24	58.13	5.16	27.19	3.56	21.75	0.18	0.62
9	25	55.55	5.75	25.96	3.63	21.30	0.15	0.60
9	26	55.73	8.93	27.83	3.62	22.68	0.12	0.51
9	27	53.08	9.31	27.30	3.82	22.78	0.40	0.61
Week avg		56.76	6.38	27.01	3.66	21.73	0.23	0.59
9	30	57.53	3.75	26.36	3.66	20.50	0.18	0.60
10	1	58.25	0.00	21.98	3.26	20.36	0.21	0.63
10	2	55.30	9.59	26.55	3.83	23.89	0.11	0.59
10	3	57.85	5.86	27.57	3.77	21.77	0.16	0.57
10	6	53.23	10.11	30.86	4.30	23.63	0.30	0.61
Week avg		55.99	7.83	26.58	3.76	22.76	0.19	0.57
10	7	56.73	12.86	29.93	4.08	26.63	0.23	0.57
10	8	53.65	16.53	29.30	4.09	25.13	0.11	0.56
10	9	60.13	11.05	27.32	3.85	27.23	0.15	0.60
10	10	52.75	19.81	30.37	4.33	27.08	0.20	0.61
10	11	53.20	15.05	32.06	3.93	28.37	0.15	0.66
Week avg		55.59	13.97	28.88	4.05	26.93	0.17	0.61
10	15	56.18	5.36	25.53	3.51	22.13	0.16	0.61
10	16	55.50	5.18	26.29	3.36	21.56	0.16	0.59
10	17	45.75	13.06	27.32	3.87	26.30	0.10	0.57
10	18	53.28	13.00	27.35	3.80	25.55	0.13	0.57
Week avg		55.13	9.65	26.67	3.59	23.88	0.14	0.55
10	21	59.57	3.48	26.13	3.83	26.23	0.12	0.53
10	22	53.26	15.35	29.79	3.75	25.97	0.15	0.53
10	23	53.13	18.82	29.92	3.96	27.39	0.08	0.50
10	24	55.15	19.57	30.86	4.11	28.89	0.17	0.66
10	25	53.22	15.38	31.02	4.08	25.67	0.18	0.63
Week avg		55.07	15.57	29.58	3.99	26.53	0.15	0.60
11	18	57.31	8.25	28.65	4.05	22.28	0.13	0.55
11	19	50.65	8.69	30.86	3.76	23.96	0.19	0.59
11	20	51.35	3.77	29.51	3.51	25.01	0.17	0.55
11	21	58.13	3.76	28.86	3.75	23.88	0.16	0.55
11	22	50.20	14.03	32.26	4.13	26.01	0.18	0.57
Week avg		53.55	9.11	30.17	3.83	25.23	0.17	0.55

Table 8-3e. (Continued)

Weekly composite (1974)		Volatile matter	Fixed carbon	Carbon	Hydrogen	Oxygen (by difference)	Sulfur	Nitrogen
11-25		50.76	9.56	30.65	6.72	22.17	0.17	0.59
12-2		60.25	8.65	28.18	6.19	23.83	0.17	0.53
12-9		60.68	10.25	34.12	6.92	31.26	0.12	0.31
12-30		67.87	8.63	27.06	5.93	25.00	0.09	0.66
(1975)								
1-6		56.06	9.28	27.71	5.93	22.91	0.17	0.62
1-13		28.36	29.33	29.23	6.63	23.37	0.16	0.53
1-20		59.12	10.31	31.98	6.90	29.37	0.26	0.56
1-27		63.22	6.17	25.55	5.90	20.78	0.20	0.66
2-3		68.93	8.98	28.20	5.83	25.26	0.16	0.60
2-10		50.53	7.67	26.97	5.66	26.73	0.23	0.53
2-17		54.85	10.02	32.23	5.69	27.30	0.17	0.61
3-3		38.86	21.80	30.98	5.79	26.18	0.16	0.53
3-10		57.06	8.29	28.56	5.37	23.69	0.15	0.53
3-17		60.75	8.02	26.35	5.65	20.23	0.11	0.65
Daily samples Date 1975 Month	Day							
3	24	63.96	7.16	23.00	3.66	21.66	0.15	0.63
3	25	45.35	6.56	23.58	3.56	26.91	0.26	0.60
3	26	65.50	7.53	27.83	5.01	20.53	0.16	0.55
3	27	55.93	7.87	26.05	3.50	26.69	0.15	0.61
3	28	39.00	6.36	22.97	3.70	18.83	0.25	0.52
3	29	65.30	7.20	25.99	3.30	20.06	0.19	0.37
Week avg		55.31	7.12	24.70	3.63	22.57	0.19	0.50
3	31	63.77	10.91	26.15	3.79	26.03	0.28	0.65
4	1	52.03	11.25	26.93	3.67	20.12	0.17	0.58
4	2	53.05	7.51	29.95	4.76	26.33	0.35	0.69
4	3	50.73	6.23	23.35	3.32	19.63	0.28	0.59
4	4	30.82	3.11	20.07	3.27	21.30	0.20	0.62
Week avg		53.63	7.79	26.68	3.76	22.25	0.26	0.50
4	7	39.69	15.03	28.19	5.31	22.19	0.20	0.53
4	8	60.17	7.11	29.86	5.22	22.67	0.76	0.61
4	9	56.31	7.05	26.61	3.81	22.75	0.23	0.55
4	10	51.25	7.60	27.90	4.18	25.68	0.61	0.68
4	11	53.85	9.39	32.12	4.76	25.69	0.25	0.65
4	12	53.63	3.08	26.23	4.27	21.98	0.20	0.62
Week avg		57.73	9.10	28.50	4.75	23.60	0.35	0.59
4	14	68.10	7.73	29.31	4.35	21.80	0.18	0.39
4	15	65.75	7.67	27.38	3.81	21.58	0.17	0.28
4	16	56.35	7.62	25.87	3.88	22.35	0.17	0.35
Week avg		56.73	7.53	27.86	4.03	21.37	0.18	0.35
4	18	53.95	7.93	26.63	3.38	21.09	0.26	0.61
4	19	53.53	6.86	22.03	3.53	26.08	0.19	0.58
4	21	53.95	8.83	27.31	4.03	20.76	0.26	0.56
4	22	60.33	8.33	26.76	3.90	19.66	0.22	0.55
4	23	38.53	5.29	23.13	3.02	17.08	0.26	0.63
Week avg		53.25	7.50	23.92	3.56	20.50	0.23	0.55

Table A-8b. (Continued)

Daily samples Date 1975 Month	Day	Volatile matter	Fixed carbon	Carbon	Hydrogen	Oxygen (by difference)	Sulfur	Nitrogen
5	28	36.59	7.65	21.29	3.06	17.20	0.18	0.50
5	29	40.67	7.79	23.02	3.92	15.76	0.17	0.55
5	30	38.17	7.10	22.31	3.56	18.02	0.15	0.55
6	1	39.70	6.50	23.65	3.56	18.16	0.10	0.53
6	2	38.58	7.30	23.08	3.60	18.51	0.17	0.56
Week avg		38.75	6.67	23.67	3.53	17.77	0.17	0.53
6	3	[illegible]	[illegible]	25.60	4.06	19.65	0.13	[illegible]
Week avg		37.37	7.01	25.60	4.06	19.65	0.13	0.67
6	10	33.94	6.91	17.55	3.55	13.20	0.21	[illegible]
6	11	37.37	6.65	22.99	2.65	15.70	[illegible]	[illegible]
6	12	[illegible]	[illegible]	23.36	3.61	18.31	0.18	[illegible]
Week avg		37.61	6.71	21.39	3.26	16.83	0.17	[illegible]
6	19	55.59	5.95	26.99	3.69	20.98	0.19	0.56
6	20	53.06	[illegible]	40.28	4.09	20.60	0.30	0.62
Week avg		53.79	6.26	33.63	3.89	20.70	0.25	0.59
6	30	47.66	6.86	25.98	3.99	16.07	0.17	0.51
7	1	47.50	6.66	18.16	4.16	21.01	0.15	0.50
7	2	63.05	7.05	25.25	4.08	22.10	0.13	0.51
7	3	53.18	7.23	27.28	4.28	20.47	[illegible]	[illegible]
Week avg		53.07	6.75	26.71	4.17	20.16	[illegible]	0.50
7	7	38.85	6.30	[illegible]	3.25	18.66	0.15	[illegible]
7	8	36.71	[illegible]	[illegible]	3.18	16.01	0.10	[illegible]
7	9	[illegible]	5.01	[illegible]	3.85	19.01	0.10	[illegible]
7	10	[illegible]	[illegible]	[illegible]	4.03	[illegible]	0.20	[illegible]
7	11	[illegible]	[illegible]	[illegible]	3.30	[illegible]	0.09	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	3.53	[illegible]	[illegible]	[illegible]
7	15	[illegible]	[illegible]	[illegible]	3.83	21.06	0.11	[illegible]
7	16	55.61	7.31	25.66	3.98	21.07	0.18	0.53
7	17	55.28	7.06	30.50	4.48	[illegible]	0.19	0.50
7	18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	6.75	28.72	4.06	21.01	0.20	[illegible]
7	[illegible]	38.07	7.00	23.80	3.53	17.01	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	6.95	[illegible]	3.69	17.30	[illegible]	[illegible]
8	5	[illegible]	[illegible]	23.65	[illegible]	[illegible]	0.13	[illegible]
8	6	[illegible]	[illegible]	[illegible]	3.10	16.98	0.15	[illegible]
8	7	[illegible]	5.75	[illegible]	3.27	16.79	0.11	[illegible]
8	8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	6.18	23.90	3.78	16.29	0.16	0.56
8	11	28.09	[illegible]	21.36	3.58	[illegible]	0.18	[illegible]
8	12	[illegible]	[illegible]	[illegible]	3.16	18.65	0.17	[illegible]
8	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Week avg		[illegible]	[illegible]	[illegible]	3.38	17.86	[illegible]	[illegible]

Table E-9a. (Concluded)

Daily samples Date 1975 Month	 Day	Volatile matter	Fixed carbon	Carbon	Hydrogen	Oxygen (by difference)	Sulfur	Nitrogen
8	19	43.91	5.50	19.92	3.72	17.17	0.15	0.55
8	20	37.28	5.66	21.79	3.21	17.31	0.15	0.67
8	21	51.29	5.06	27.43	4.09	17.65	0.16	0.69
8	22	53.19	5.95	25.28	3.81	17.64	0.15	0.63
Week avg		51.57	5.35	26.11	3.71	17.50	0.18	0.57
8	28	49.70	5.05	23.83	3.06	17.25	0.16	0.66
8	29	52.08	6.10	23.36	3.63	20.12	0.10	0.53
Week avg		51.79	5.57	25.09	3.36	18.61	0.13	0.57
9	2	58.95	5.00	24.85	3.55	18.17	0.17	0.71
9	3	57.61	5.76	27.36	3.99	19.79	0.15	0.57
9	4	60.63	6.66	29.63	3.93	15.60	0.07	0.65
9	5	58.67	6.38	26.23	3.51	18.25	0.16	0.57
Week avg		51.91	a/ 5.71	25.29	3.75	17.88	0.15	0.58

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a/ Fine grind.

Table B-3c. PROXIMATE AND ULTIMATE ANALYSIS OF
REFUSE FUEL PRODUCED
REGRIND TEST - FEBRUARY 19, 1975
(Material reground through same 1-in. sq. grate as
used on first grind)

Received moisture basis	
Heating value (Btu/lb)	6,075.7
Moisture (wt. %)	26.90
Ash (wt. %)	17.95
Volatile matter (wt. %)	46.44
Fixed carbon (wt. %)	8.71
Carbon (wt. %)	29.82
Hydrogen (wt. %)	2.51
Oxygen (wt. % by difference)	22.20
Sulfur (wt. %)	0.17
Nitrogen (wt. %)	0.45

Table B-5a. WEEKLY SUMMARY PLANT ENERGY BALANCE, kJ x 10^6 a/
(Total heat energy kJ x 10^6)

	Plant input	Plant output					
Week of production	31 Mill discharge	37 RDF produced	55 Magnetic belt rejects	67 Magnetic drum rejects	68 Ferrous metal by-products	Total	Energy loss
1	14,819	12,793	575	7	363	13,738	1,082
2	15,136	12,233	792	7	550	13,582	1,553
3	10,342	8,399	356	b/	281	9,036	1,307
4	7,556	5,951	322	b/	180	6,453	1,093
5	8,219	7,049	474	b/	176	7,699	520
6	c/						
7	c/						
8	11,861	9,903	382	8	238	10,531	1,330
9	5,942	5,068	256	3	108	5,435	506
10	3,853	5,041	211	5	111	5,368	(1,515)
11	3,118	3,274	56	1	46	3,377	(259)
12	c/						
13	7,610	6,086	317	2	353	6,758	852
14	3,770	6,015	136	4	122	6,277	(2,507)
15	6,918	5,701	216	1	167	6,085	833
16	9,211	7,612	296	8	129	8,045	1,166
17	6,771	5,595	370	3	81	6,049	722
18	7,805	5,824	216	6	180	6,226	1,579
19	3,885	3,768	200	5	137	4,110	(225)
20	1,005	930	27	1	28	986	19
21	5,772	5,576	236	3	135	5,950	(178)
22	6,350	4,680	167	3	120	4,970	1,380
23	1,715	1,177	135	1	39	1,352	363
24	16,838	10,843	532	8	139	11,522	5,316
25	13,623	12,752	295	9	267	13,323	300
26	12,902	11,710	595	8	248	12,561	341
27	8,128	6,591	321	5	119	7,063	1,060
28	8,117	6,033	300	1	113	6,447	1,670
29	8,616	7,868	468	6	203	8,545	71
30	381	343	14	0	11	368	13
31	6,188	5,412	291	3	31	5,737	451
32	4,989	4,451	136	2	41	4,630	359
33	c/						
34	c/						
35	c/						
36	5,580	4,737	277	8	155	5,177	403
37	7,339	5,970	212	5	135	6,322	1,017
38	8,300	7,450	311	6	152	7,919	381
39	c/						
40	3,726	3,077	151	2	73	3,303	423
41	10,611	8,048	451	5	130	8,634	1,977
42	7,131	5,139	555	5	152	5,851	1,280
43	7,971	6,826	456	6	108	7,396	575
44	5,995	5,114	233	3	33	5,383	612
45	10,330	8,376	509	8	168	9,061	1,269
Total	287,251	238,365	11,570	153	6,551	256,105	31,146

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a/ Heat energy (kJ x 10^6) calculated from daily heating value (kJ/kg) times daily weight (kg) for test days when daily samples taken. During test period when only weekly composite samples were taken (weeks 9 through 23) heat energy calculated from weekly composite heating value and weekly total weight.

b/ Heating value of magnetic drum rejects not determined. Calculated energy loss therefore includes magnetic drum rejects.

c/ Samples not taken; therefore, no heating value data available.

Table B-16. WEEKLY SUMMARY OF PLANT ENERGY BALANCES a/
(Expressed as percent of hammermill discharge)

Week of production	Plant input S1 Mill discharge	Plant output S2 RDF produced	Plant output S5 Magnetic belt rejects	Plant output S7 Magnetic drum rejects	Plant output S8 Ferrous metal by-products	Total	Energy loss
1	100	77.95	5.25	0.05	1.35	89.69	10.31
2	100	81.57	5.27	0.05	1.91	89.71	10.29
3	100	81.24	3.63	b/	2.21	87.36	[illegible]
4	100	75.85	3.26	b/	[illegible]	81.41	[illegible]
5	100	65.76	5.17	b/	.15	71.47	[illegible]
6	c/						
7	c/						
8	100	93.31	1.22	0.07	2.18	96.75	[illegible]
9	100	87.57	1.17	0.06	1.48	89.75	[illegible]
10	100	103.16 d/	1.50	0.11	[illegible]	115.51	[illegible]
11	100	105.20 d/	1.19	0.10	1.28	107.[illegible]	[illegible]
12	c/						
13	100	78.97	4.16	0.08	3.19	88.80	11.20
14	100	153.95 d/	1.20	0.11	3.11	161.38	(-61.38)
15	100	77.25	1.96	0.02	2.68	83.91	16.09
16	100	82.65	1.22	0.07	1.50	87.[illegible]	12.51
17	100	81.62	5.57	0.05	1.20	89.35	10.66
18	100	74.83	2.17	0.05	2.11	79.16	20.84
19	100	97.01	4.16	0.11	3.53	105.01	(-5.01)
20	100	92.11	2.71	0.11	2.06	96.00	4.00
21	100	95.90	4.06	0.09	2.35	101.3[illegible]	[illegible]
22	100	73.70	1.84	0.05	1.83	78.[illegible]	21.[illegible]
23	100	73.63	2.88	0.06	2.22	78.8[illegible]	21.17
24	100	83.21	2.58	0.09	2.01	87.89	12.10
25	100	81.5[illegible]	1.90	0.10	1.71	85.19	[illegible]
26	100	[illegible]	1.00	0.01	[illegible]	[illegible]	[illegible]
27	100	84.11	1.95	0.05	1.81	[illegible]	[illegible]
28	100	75.07	1.81	0.05	1.39	[illegible]	[illegible]
29	100	97.31	1.28	0.37	2.60	[illegible]	[illegible]
30	100	[illegible]	1.81	[illegible]	[illegible]	[illegible]	[illegible]
31	100	[illegible]	1.55	0.05	1.30	[illegible]	[illegible]
32	100	80.87	2.30	0.09	1.97	[illegible]	[illegible]
33	c/						
34	c/						
35	c/						
36	100	81.90	1.56	0.06	3.45	[illegible]	[illegible]
37	100	89.16	1.28	0.07	1.82	92.13	[illegible]
38	100	90.16	1.78	0.08	1.71	[illegible]	[illegible]
39	c/						
40	100	82.96	3.11	0.07	1.94	[illegible]	[illegible]
41	100	75.73	3.31	0.05	1.57	81.37	[illegible]
42	100	77.07	3.79	0.05	2.13	[illegible]	[illegible]
43	100	85.00	5.72	0.08	1.36	[illegible]	[illegible]
44	100	81.15	3.66	0.06	1.96	[illegible]	[illegible]
45	100	80.17	3.08	0.08	1.82	85.09	[illegible]
Average based on total weights (Table B-14)	100	83.71	3.01	0.06	1.35	88.18	11.8[illegible]

a/ Based on data presented in Table B-9a.
b/ Heating value of magnetic drum rejects was not determined. Calculated energy loss therefore includes magnetic drum rejects.
c/ Samples not taken. Therefore, no heating value data available.
d/ Values above 100% due to larger than normal difference between S1 and S2 heating values. Assume nonrepresentative sample of S1 or S2 or both. Values not plotted in Figure 11.

Table B-3. WEEKLY SUMMARY OF PLANT FERROUS METAL RECOVERY[a]

Week of production	51 RDF produced	55 Magnetic belt rejects	57 Magnetic drum rejects	58 Ferrous metal by-products	Total	Recovery ferrous metal (%)
	Magnetic metal (Mg)					
1	1.23	36.13	0.86	69.17	107.67	64.2
2	2.17	38.03	0.36	85.07	125.27	67.9
3	6.53	12.08	0.83[b]	52.53	71.93	73.0
4	0	11.52	0.84[b]	35.05	46.96	73.7
5	2.27	7.91	0.92[b]	37.91	48.93	77.7
6	[c]					
7	[c]					
8	0	3.53	0.95	50.70	55.23	91.8
9	0	5.51	0.58	20.76	26.85	77.3
10	0	7.15	0.85	25.96	33.97	76.4
11	0	0.23	0.39	2.87	3.49	82.2
12	[c]					
13	0	3.31	0.98	66.53	70.82	93.9
14	0	12.38	0.65	53.59	66.60	80.6
15	0	23.18	0.06	27.95	51.19	54.6
16	0	21.76	0.83	24.63	47.22	52.2
17	0	41.06	0.53	15.53	57.12	27.2
18	0	2.60	0.65	33.03	36.28	91.0
19	0	6.80	0.60	26.31	33.71	78.0
20	0.28	0.13	0.16	5.52	6.07	90.9
21	0	11.03	0.57	26.10	39.66	65.8
22	0	1.86	0.51	23.76	26.99	88.1
23	0	1.05	0.15	9.60	10.59	91.2
24	3.86	9.76	1.17	63.12	77.93	81.5
25	13.16	9.75	1.36	51.62	75.89	68.0
26	1.53	16.70	1.06	65.71	85.00	77.3
27	0	3.05	0.31	28.71	32.07	89.5
28	0	30.98	0.65	31.96	63.59	50.3
29	0	11.11	0.77	40.10	51.98	77.1
30	0	0.93	0.02	2.17	3.11	69.6
31	0	12.36	0.60	15.87	28.83	55.0
32	4.16	1.01	0.56	17.77	25.18	70.6
33	[c]					
34	[c]					
35	[c]					
36	0	6.17	0.19	28.79	35.15	81.9
37	0	5.96	0.05	26.11	32.12	81.3
38	0	7.75	0.66	28.15	36.56	77.0
39	[c]					
40	0	4.31	0.30	14.09	18.70	75.3
41	0	7.11	0.86	25.13	33.10	75.9
42	0	6.95	0.56	28.79	36.30	79.3
43	6.31	6.03	0.91	35.83	49.08	73.0
44	0	4.13	0.63	17.97	22.73	79.1
45	0	6.80	0.83	32.82	40.45	81.1
Total	61.36	506.83	26.96	1,306.27	1,685.4	77.5

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[a] Megagrams of magnetic metal calculated from weekly sum of daily percent ferrous metal times daily weight (Mg) for test days when daily samples were taken. During test period when only weekly composite samples were taken (weeks 9-23) recovery calculated from weekly composite percent ferrous metal and weekly total weight. Weighted average percent ferrous metal would be weekly megagrams ferrous metal divided by total weekly megagrams.

[b] Assumes 86.3% magnetic material. Samples not taken of stream 57.

[c] Samples not taken. Therefore no percent magnetic metal available.

Table B-5. DAILY SAMPLES OF REFUSE DERIVED FUEL (STREAM 9)
(Daily composite of four subsamples equally spaced throughout the day)

Daily samples		Moisture	Ash %		Heating value (kJ/kg)		
Date 1976		% as	As	Moisture	As	Moisture	Moisture and
Month	Day	received	received	free	received	free	ash free
9	23	27.10	21.11	29.30	11,386	15,895	22,388
9	24	26.30	22.63	27.72	11,477	15,569	21,507
9	25	12.80	11.89	23.63	10,183	16,096	21,016
9	26	27.80	17.56	26.30	11,187	16,069	21,201
9	27	25.50	19.51	26.12	11,798	15,795	21,378
9	30	38.60	14.91	27.98	11,590	17,174	22,603
10	1	31.00	13.76	32.98	10,097	14,632	21,011
10	2	29.40	16.01	22.67	10,788	15,280	19,720
10	3	26.50	21.80	28.87	11,683	15,676	21,756
10	6	17.90	18.87	22.98	12,702	15,651	20,074
10	7	17.00	23.61	29.20	12,596	15,173	21,117
10	8	20.10	20.70	25.93	12,153	15,212	20,532
10	9	23.90	18.96	24.91	13,613	17,788	23,612
10	10	18.10	19.23	23.51	13,339	16,307	21,317
10	11	16.30	21.90	26.39	12,920	15,086	19,952
10	15	31.80	19.60	26.05	10,670	15,668	21,600
10	16	31.17	15.96	23.57	10,613	15,680	20,516
10	17	26.10	17.61	23.20	12,117	15,871	20,666
10	18	27.70	15.06	20.80	11,611	16,059	20,277
10	21	23.20	21.93	28.56	13,060	16,207	19,887
10	22	23.10	17.19	22.28	12,269	15,929	20,568
10	23	22.50	15.55	20.06	12,608	16,268	20,351
10	24	15.10	20.23	23.83	13,193	15,538	20,400
10	25	19.10	18.30	22.62	12,693	15,690	20,276
11	18	17.60	17.05	23.58	11,357	15,691	20,269
11	19	22.17	18.50	23.82	11,937	15,326	20,115
11	20	25.60	15.56	20.55	12,269	16,203	20,396
11	21	23.80	19.25	25.30	11,722	15,366	20,513
11	22	11.70	16.09	15.13	13,198	16,967	18,003
(1977)							
3	24	31.80	28.12	35.53	10,567	13,362	20,683
3	25	19.60	24.80	35.30	10,996	13,673	20,823
3	26	18.70	28.37	36.30	11,633	14,309	21,980
3	27	13.00	15.20	21.10	10,863	16,183	20,537
3	28	28.90	15.96	15.10	9,786	13,766	21,109
3	29	31.50	11.62	22.80	10,887	15,908	20,606
3	31	25.50	19.82	26.60	11,387	15,266	20,789
4	1	21.00	27.29	33.00	10,971	13,888	21,388
4	2	14.50	19.13	23.90	12,863	15,607	20,508
4	3	19.60	33.65	41.75	9,126	11,330	19,131
4	6	15.70	32.37	38.60	11,667	13,603	22,083
4	7	15.20	26.13	32.70	11,712	16,318	21,150
4	8	17.50	26.99	30.30	11,771	16,288	20,670
4	9	18.50	27.53	33.80	10,652	13,067	18,736
4	10	17.60	23.93	29.00	11,689	13,910	19,591
4	11	2.35	56.53	55.30	13,742	13,039	20,156
4	12	18.30	28.53	35.06	10,881	12,851	19,835
4	13	27.30	21.07	28.70	11,520	16,656	20,560
4	14	32.40	22.38	28.60	11,783	16,926	21,193
4	15	25.10	22.93	28.90	11,018	16,381	20,693
4	18	22.50	27.75	35.80	10,201	13,162	20,303

Table 6.6. (Concluded)

Daily samples Date 1977 Month	 Day	Moisture % as received	Ash % As received	 Moisture free	Heating value (kJ/kg) As received	 Moisture free	 Moisture and ash free
4	19	27.50	27.13	35.00	10,753	13,875	21,356
4	21	26.30	22.86	30.20	10,592	13,993	20,066
4	22	19.50	31.66	39.30	9,268	11,488	18,935
4	23	36.70	21.39	33.80	7,371	11,630	17,566
4	28	33.20	27.57	39.50	7,970	11,618	18,871
4	29	28.70	23.68	33.50	9,966	13,978	21,020
4	30	33.90	18.73	28.33	9,316	14,531	20,130
5	1	29.10	26.75	37.90	9,566	13,966	20,681
5	2	33.50	20.55	40.91	9,256	13,915	20,161
5	9	30.60	19.71	28.61	9,815	14,103	19,755
5	12	31.10	26.05	37.80	9,081	13,179	21,188
5	13	36.50	23.63	35.78	8,772	13,317	20,736
5	16	36.70	17.28	26.56	9,806	15,165	20,671
5	19	23.50	26.17	33.60	9,836	13,185	19,505
5	20	19.50	26.93	33.90	10,971	13,617	21,235
6	30	29.60	31.68	30.80	10,685	15,175	21,936
7	1	18.80	27.05	33.30	11,296	13,909	20,853
7	2	25.90	22.01	29.70	8,813	11,896	16,919
7	3	30.60	27.00	36.00	10,621	13,125	19,886
7	7	36.20	14.95	29.70	8,800	13,791	19,620
7	8	36.00	31.75	37.50	6,932	10,543	16,805
7	9	32.30	19.11	29.60	7,609	14,291	20,262
7	10	25.60	22.98	30.80	10,657	14,285	20,665
7	11	35.12	23.69	36.20	8,315	13,103	21,205
7	14	27.60	20.91	28.80	10,403	14,328	20,126
7	15	25.10	23.65	31.30	10,785	15,396	20,951
7	17	16.50	21.55	25.87	9,381	11,237	15,153
7	18	33.10	18.28	27.60	9,911	14,859	20,687
7	31	31.60	23.53	34.30	9,700	15,150	21,572
8	1	29.80	21.10	30.10	10,176	14,516	20,766
8	5	37.10	17.17	27.30	9,757	15,517	21,131
8	6	39.90	20.73	36.50	8,050	11,396	20,663
8	7	33.90	23.00	36.80	9,251	13,997	21,667
8	8	23.50	23.56	35.60	9,988	15,020	23,250
8	11	37.80	25.61	35.50	8,170	11,316	17,566
8	14	30.60	28.13	40.60	8,985	12,793	21,465
8	15	30.90	22.35	32.70	10,078	14,586	21,510
8	19	36.90	16.09	25.50	10,010	15,861	21,293
8	20	43.20	15.86	25.70	8,199	14,373	19,347
8	21	31.30	31.78	31.70	10,323	15,026	22,000
8	22	30.90	19.91	28.90	9,853	14,258	20,056
8	28	39.20	15.05	26.60	9,758	16,069	21,806
8	29	40.30	10.83	18.10	9,917	16,586	20,250
9	2	35.60	17.63	27.60	9,826	15,259	21,017
9	3	31.30	16.83	26.50	11,153	16,016	22,275
9	6	35.60	17.70	27.60	10,468	16,236	22,363
9	5	36.20	20.73	31.50	9,581	14,561	21,257
n		47	47	47	47	47	47
$\bar{x}$		26.55	21.71	29.56	10,636	14,695	20,570
Sx		7.275	4.610	5.368	1,370.1	1,500.5	1,266.2
C.V. %		27.60	21.23	18.10	12.88	9.98	6.15

Table 5-7a. WEEKLY MATERIAL BALANCE: TB

Week of production	Plant input (raw refuse received)	RDF produced	Magnetic belt rejects	Magnetic drum rejects	Ferrous metal by-product	Total	Material loss
		Plant output					
1	1,387.2	1,073.8	101.5	1.1	55.7	1,251.1	136.0
2	1,420.4	[illegible]	125.0	1.1	83.1	1,336.0	106.8
3	819.3	651.6	65.8	1.0	53.7	771.8	47.8
4	705.1	531.8	55.1	0.9	36.7	623.5	81.5
5	706.3	567.0	61.6	1.1	33.7	663.2	43.1
6	201.7	122.8	19.1	0.3	13.5	155.8	5.4
7	421.3	387.2	36.7	0.7	21.6	415.1	5.2
8	966.0	815.2	75.7	1.1	69.8	961.9	23.0
9	420.9	315.6	31.8	0.5	20.5	368.3	51.3
10	475.6	417.8	32.1	0.9	25.6	476.8	0
11	371.2	332.1	15.0	0.5	6.7	353.3	0
12	110.8	85.7	3.4	0.2	5.1	95.3	15.1
13	700.7	531.1	51.1	1.3	80.6	671.6	32.7
14	805.1	661.9	12.2	0.7	23.3	900.3	101.8
15	461.9	396.6	51.1	0.1	28.0	481.8	0
16	631.7	533.9	48.8	0.9	26.7	608.3	23.8
17	681.9	518.1	63.1	0.5	11.5	619.3	61.5
18	651.4	491.7	42.5	0.7	34.7	570.1	81.5
19	378.1	320.1	31.6	0.6	20.3	378.0	0
20	85.4	70.7	4.9	0.1	5.5	81.0	4.9
21	510.6	431.7	36.5	0.5	38.1	506.8	4.1
22	516.8	381.1	38.4	0.5	22.8	443.0	73.8
23	153.6	114.7	12.6	0.2	8.6	138.6	15.3
24	1,276.8	983.6	76.9	1.3	61.6	1,120.0	106.8
25	1,301.0	1,135.5	56.3	1.5	51.7	1,238.3	67.5
26	1,333.2	1,093.7	88.9	1.3	66.8	1,314.7	173.5
27	839.1	688.1	56.0	0.8	29.7	773.6	65.6
28	865.3	621.9	53.8	0.6	38.9	715.9	123.3
29	1,084.1	855.7	73.1	0.9	40.3	976.0	108.2
30	53.8	50.3	4.6	0.3	2.1	50.7	3.1
31	725.0	566.0	60.3	0.5	15.7	633.6	91.4
32	616.7	387.5	23.6	0.7	17.8	431.1	85.1
33	[illegible]	72.8	8.2	0.2	6.1	85.5	1.5
34	81.1	67.3	5.9	0.3	5.0	76.1	5.0
35	88.9	67.3	11.5	0.3	5.5	86.2	2.7
36	651.1	353.8	40.8	0.8	28.5	373.3	18.3
37	761.2	651.7	53.1	0.5	15.9	740.6	8.3
38	843.0	735.8	61.1	1.0	39.6	835.5	7.6
39	53.6	47.3	4.3	0.1	1.8	48.6	7.0
40	367.1	305.3	73.3	0.6	16.2	367.1	0
41	1,027.7	860.7	69.0	0.9	25.1	953.8	73.9
42	760.1	567.8	71.2	0.6	23.7	669.5	90.6
43	813.6	755.3	66.0	1.0	27.6	810.9	3.6
44	495.1	413.2	31.6	0.5	18.3	463.3	25.8
45	946.8	863.6	64.6	1.0	33.0	962.3	31.4
Total	28,781.6	22,871.3	2,019.8	28.7	1,268.3	25,738.5	2,336.1
Total corrected weight daily scale error	(27,756.3)	(22,339.1)	(2,087.9)	(25.7)	(1,316.1)	(25,695.8)	(1,089.7) -[illegible] less moisture (1,878.9) and particulate loss per total plant loss

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a/ Estimated value, material not weighed.

Table A-16. WEEKLY MATERIAL BALANCE (Expressed as percent of raw refuse received)

Week of production	Plant input raw refuse received	Plant output					Material loss
		RDF produced	Magnetic belt rejects	Magnetic drum rejects	Ferrous metal byproduct	Total	
1	100	77.56	7.53	0.08	5.02	90.19	9.81
2	100	77.53	8.95	0.08	6.07	92.52	7.48
3	100	79.61	8.03	0.12	6.41	94.17	5.83
4	100	75.52	7.81	0.13	4.83	88.29	11.71
5	100	80.50	9.73	0.15	4.78	95.16	4.84
6	100	83.78	7.27	0.10	5.12	96.27	3.73
7	100	86.74	6.32	0.11	5.50	98.67	1.33
8	100	84.50	[illegible]	0.11	3.16	97.51	2.49
9	100	75.33	7.58	0.14	3.95	87.00	13.00
10	100	87.53	6.77	0.19	5.51	100.00	0
11	100	[illegible]	5.96	0.47	3.53	100.00	0
12	100	77.15	5.93	0.16	5.00	88.21	11.79
13	100	75.36	7.61	0.15	9.45	92.57	7.43
14	100	73.17	[illegible]	0.12	3.90	82.69	17.31
15	100	85.06	[illegible]	0.02	6.05	100.00	0
16	100	80.57	[illegible]	0.16	3.90	[illegible]	3.77
17	100	81.77	9.50	0.07	2.35	93.58	6.42
18	100	75.50	6.58	0.11	5.17	87.36	12.64
19	100	85.67	8.21	0.16	6.96	100.00	0
20	100	81.32	5.17	0.21	6.37	93.22	6.78
21	100	86.87	9.11	0.11	3.11	99.20	0.80
22	100	73.94	7.43	0.09	4.45	85.91	14.09
23	100	75.25	8.15	0.13	5.65	89.16	10.85
24	100	80.31	3.78	0.10	5.26	91.45	8.55
25	100	81.83	3.92	0.11	3.73	89.60	10.40
26	100	75.21	5.67	0.10	6.01	86.99	13.01
27	100	82.00	6.67	0.08	3.52	92.17	7.83
28	100	75.81	7.55	0.07	2.48	85.81	14.19
29	100	75.79	6.93	0.08	3.71	90.01	9.99
30	100	80.67	7.95	0.16	3.81	92.37	7.63
31	100	78.18	6.93	0.06	2.19	87.36	12.64
32	100	82.47	5.99	0.10	3.29	91.85	8.15
33	100	83.63	9.70	0.21	4.90	98.23	1.77
34	100	78.09	6.93	0.11	5.86	91.19	8.81
35	100	77.20	13.26	0.10	6.28	96.84	3.16
36	100	80.50	8.06	0.15	6.25	94.96	5.04
37	100	82.15	5.55	0.11	2.00	89.69	10.31
38	100	88.72	7.33	0.12	3.53	99.60	0.40
39	100	73.38	7.38	0.17	5.50	86.93	13.07
40	100	88.81	7.00	0.11	5.08	100.00	0
41	100	83.70	5.56	0.09	3.36	92.71	7.29
42	100	75.65	5.57	0.08	6.80	88.10	11.90
43	100	87.38	8.11	0.12	3.39	99.50	0.50
44	100	86.67	6.07	0.09	3.70	96.53	3.47
45	100	86.63	5.45	0.11	3.58	95.67	4.33
Average based on total weight (Table A-11)	100	80.60	7.20	0.11	5.52	93.43	6.57
Average based on corrected weight (Table A-11)	(100)	(80.08)	(7.53)	(0.11)	(4.73)	(92.65)	(7.35) 1.31 less moisture and particulate loss 6.04 net material loss

APPENDIX C

ENVIRONMENTAL TEST PROCEDURES AND DATA

TEST PROCEDURES FOR AIR EMISSION SAMPLING

Visual observation of the effluent from the ADS cyclone had indicated that it contained some large particles (pieces of paper, etc.) and was perhaps one of the more significant sources of debris that occurs in and around the plant. However, some windblown debris also undoubtedly occurs from the semi-enclosed conveyors and spillage from loading of packer trucks, etc.

Since it was obvious that the ADS cyclone discharge contained these large particles, it was considered impractical to sample the effluent using EPA Method 5 sampling trains because the small probe tips that are required would very likely be plugged by the large particles. The same would have been true for the cascade impactors that are usually used to determine particle size distribution of particulate matter in effluent streams. Therefore, it was necessary to utilize high volume sampling techniques with their larger probes about 25-mm (1-in.) diameter. Both a high volume mass train and high volume cascade impactor, equipped with a precyclone, were provided by EPA for this work.

ADS CYCLONE TEST PROCEDURES

Sampling of the ADS cyclone discharge was carried out in the 1.07-m (42-in.) diameter horizontal duct at the inlet to the ADS fan as shown in Figure C-1. Two 102-mm (4-in.) diameter sampling ports had been installed in the top and side of this duct. The nearest flow disturbance, relative to the sampling ports, was five duct diameters upstream (a 90-degree elbow) and two diameters downstream (air flow control vanes and fan).

Particulate sampling of the emissions from the ADS cyclone was carried out with a high volume sampler of approximately 0.007 m^3/s (15 cfm). Sampling was conducted using a 23-mm (0.91-in.) diameter probe tip and sampling for 2 min at 16 points along each of the two duct traverses. Configuration of the mass sampling equipment is shown in Figure C-2. Isokinetic sampling was carried out, but it was necessary to determine the proper sampling rate based on a preliminary velocity traverse.

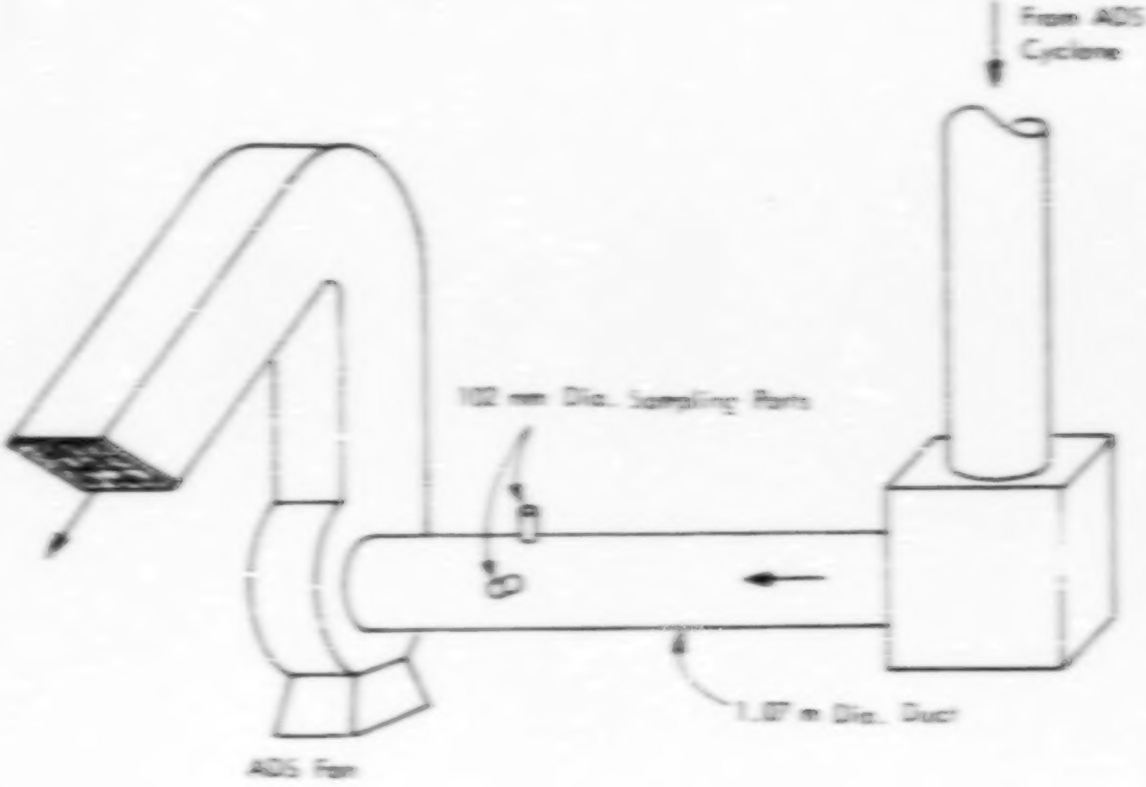
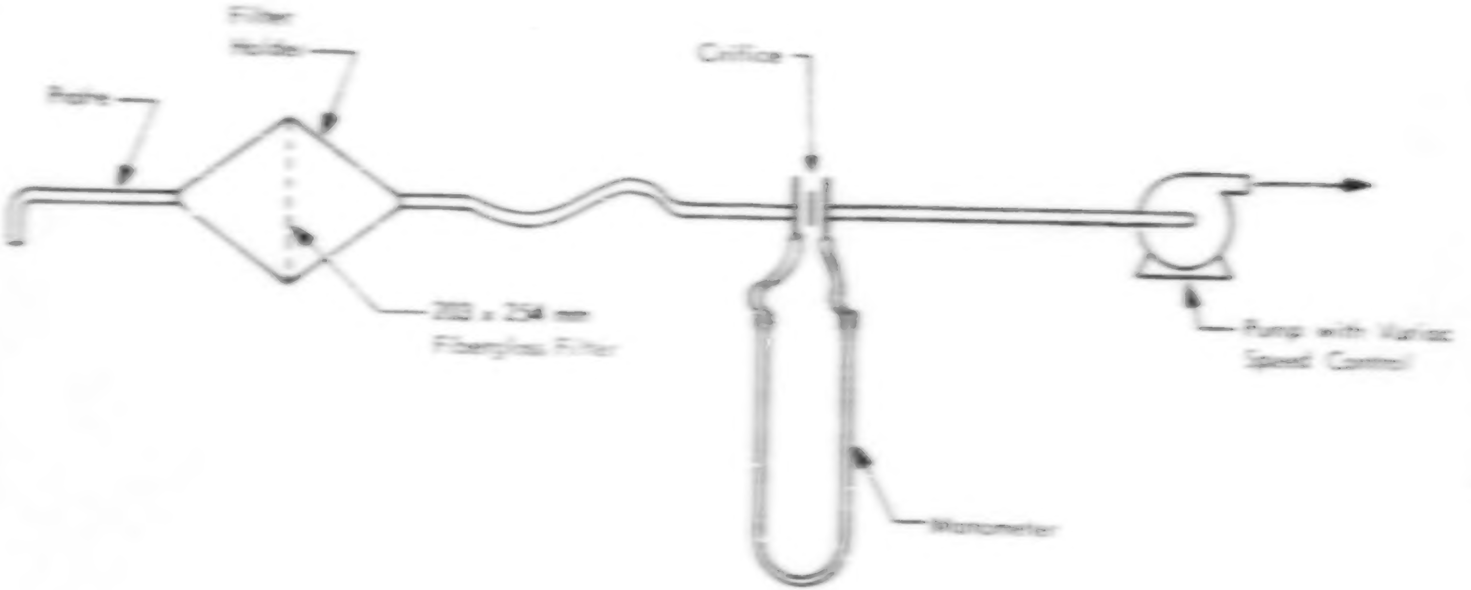

From ADS
Cyclone
102 mm Dia. Sampling Ports
1.07 m Dia. Duct
ADS Fan

Figure C-1. Diagram of ADS cyclone discharge sampling locations


Filter Holder
Probe
Orifice
203 x 254 mm Fiberglas Filter
Pump with Variac Speed Control
Manometer

Note:

A preliminary velocity traverse was made of gas flow in duct in order to determine proper sampling rate at each sample point. Average sampling rate was about 0.007 m^3/s

During tests at Hammermill Cyclone, heated probe and filter holder were used, along with ice cooled condenser preceeding the orifice.

Figure C-2. Diagram of particulate mass sampling equipment

Particle size distribution of the ADS cyclone discharge was determined using the Anderson Hi-Volume cascade impactor and precyclone provided by EPA as depicted in Figure C-3. A 29-mm (1.125-in.) diameter probe tip was used and the sampling was conducted for 30 min at a single point near the center of the duct.

HAMMERMILL CYCLONE TEST PROCEDURE

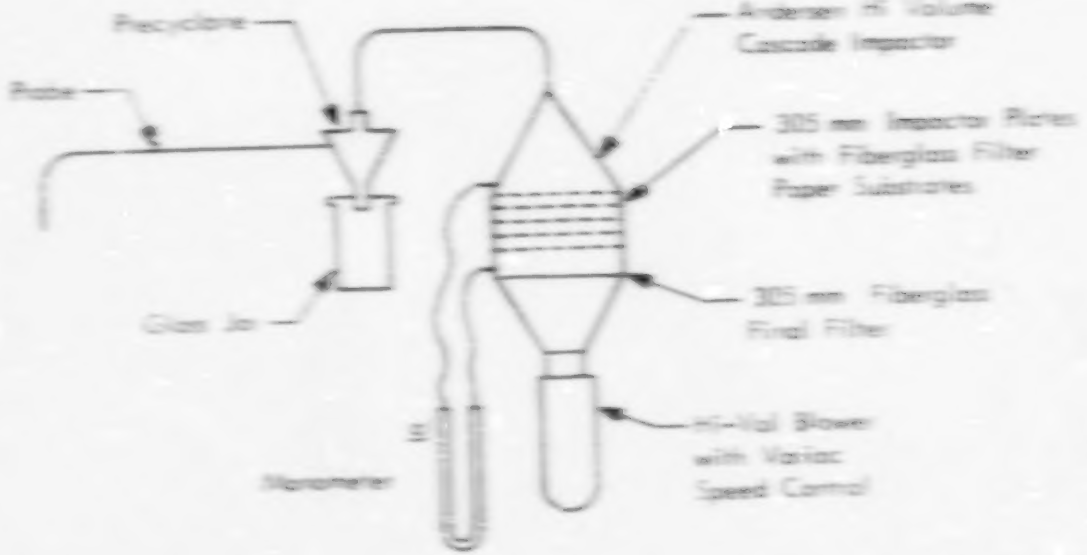
Sampling of the hammermill cyclone discharge was carried out in a 0.3-m (12-in.) diameter vertical duct extension equipped with two sampling ports 90 degrees apart. The end of this duct extension was two duct diameters downstream of the sampling ports and there were in excess of 10 duct diameters upstream of the ports before any flow disturbance.

Particulate sampling of emissions from the HM cyclone was carried out using the same equipment as for sampling of the ADS system (see Figure C-2). The only differences were the selection of the 29-mm (1.125-in.) diameter probe tip and use of the probe heater, heating jacket for the filter holder, and moisture trap ahead of the orifice, in order to minimize problems due to high moisture content of the effluent stream. Sampling was conducted for 5 min at four points along each of the two duct traverses. Again, sampling rate at each point was based on a preliminary velocity traverse.

Particle size distribution tests on the HM cyclone discharge were done using the same high volume cascade impactor used for sampling the ADS system (Figure C-3). The 29-mm (1.125-in.) diameter probe tip was used and the sampling was conducted for 1 hr at a single point near the center of the duct. However, because of the high moisture content of this stream, the heated probe and heating jacket for the impactor were used.

The effective cutoff for the impactor stages are noted in the attached tables. In considering these values, it was assumed that the cutoff diameter for the precyclone was ≈ 10 μm. However, the cutoff diameter for the impactor stages strictly applies only to spherical particles of density 1.0, which undoubtedly is not the case for the particles in these effluent streams. In this regard, visual inspection of the material caught on the mass train filter and in the precyclone showed much of it to be of a fibrous linty nature, similar in appearance to material collected in a household vacuum cleaner. Small pices of paper and plastic approximately 25 mm by 25 mm (1 in. by 1 in.) in size were also observed.

Bearing in mind the considerations discussed above, it is significant to note that the data indicate that most of the particulate matter (> 80%) was caught in the precyclone.


Precyclone
Probe
Glass Jar
Andersen Hi Volume
Cascade Impactor
305 mm Impactor Plates
with Fiberglass Filter
Paper Substrates
305 mm Fiberglass
Final Filter
Hi-Vol Blower
with Variac
Speed Control
a/
Manometer

a/ Constant flow at 0.009 m^3/s maintained by adjusting blower speed to keep manometer reading constant at 1.44 kPa (5.8 inches water column)

Figure D-1. Diagram of particle size sampling equipment.

HAZARDOUS TESTS

Mass emission test data for the July 1975 hazardous tests were not tabulated as in previous tests because samples were split in the field for bacteria and virus analysis. No particle size tests were conducted during the July 1975 tests. Procedures for hazardous tests are contained in the body of this report under the section entitled "Potentially Hazardous Air Emissions."

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APPENDIX D

STATISTICAL EVALUATION OF PROCESS STREAM SAMPLES

It was realized that the sampling methodology for characterizing the process streams might involve considerable error and not yield representative results. Therefore, a statistical evaluation of certain data was performed. The methods used to perform these statistical evaluations and the results are discussed in the following paragraphs.

STATISTICAL DIFFERENCE BETWEEN REFUSE FUEL ENTERING AND LEAVING THE STORAGE BIN

The daily sample analysis results for the 10-day period of September 27 through October 6, 1976, of refuse fuel entering the storage bin (S2) and refuse fuel leaving the storage bin (S1) were subjected to statistical analysis.

At 95% statistical confidence coefficient, there was no significant difference between S2 and S1 for any of the sample spectrums except bulk density. The bulk density data were reanalyzed and found to be significantly higher in S1 even at 99% confidence coefficient.

Bulk density is higher in the storage bin discharge due to the bin packing factor. Weight of material in the bin causes material compaction at the lower bin elevations. Since the bin was designed to discharge the material at the bin bottom, this discharged material is always more compressed and has a higher kg/m^3 (lb/ft^3) bulk density than the material entering the bin from the top.

SAMPLE VARIABILITY

Two tests were performed to determine sample variance. First, eight subsamples evenly spaced over a 2-hr period were taken of the milled raw refuse (S1) and the cyclone discharge (S2). Second, eight subsamples evenly spaced over a 1-hr period were taken of the refuse fuel entering the storage bin (S2) and leaving the storage bin (S3). Each individual subsample was analyzed. The individual results are shown in Appendix B (Table B-4).

The sample results were subjected to statistical analysis. It was determined that there was no significant difference in sample variability between samples taken over a 1-hr interval and those taken over a 2-hr interval. Whatever short term time trends may be present, they do not affect the variability or dispersion of the sample data.

Daily samples of the various plant refuse streams were composed of four subsamples taken at 2-hr intervals which were composited to form one daily sample that was inspected and analyzed. Daily sample results are therefore the mean of four subsamples. The precision of such a mean can be calculated from the pooled sample variance of the previously mentioned test data listed in Table B-4. Table 21 shows the variability for each analysis spectrum category based on 95% confidence coefficient for a sample size of four. In general, the data in Table 21 indicated that results obtained by the normal sampling method (i.e., sample size of four) could be expected, with 95% confidence, to be within ± 10 to 15% of the actual mean value for most analysis species (e.g., heating value, moisture, etc.).